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December 1954

Agriculture

*The Journal of the
Ministry of Agriculture*



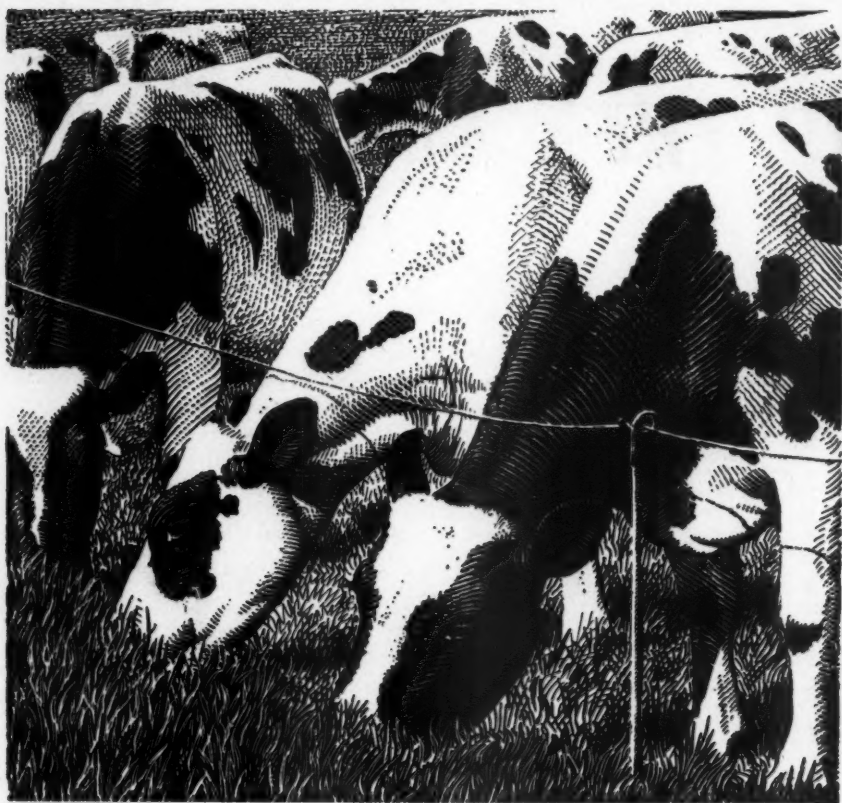
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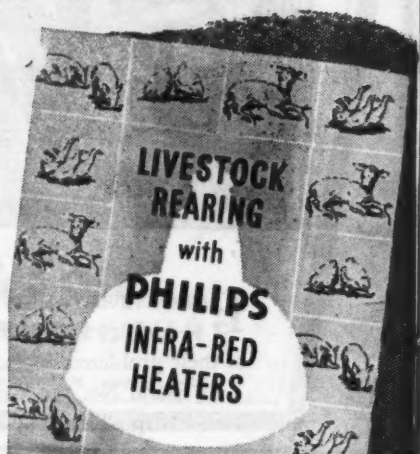
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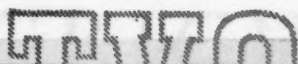
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DECEMBER 1954

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Cover Photograph

Christmas trees from Kidder Forest, Northumberland.

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£1 'saved' on fertilizers £4 lost on the crop

Of all the false economies, none is more disastrous than the idea that you can 'save' by spending less on fertilizers. It is killing the goose that lays the golden eggs. The table below shows how this can work out in practice. It is compiled from figures collected by the Agricultural Economics Department of Manchester University. A total of 46 farms were studied, and grouped according to the range of their fertilizing costs. This table

picks out the two major groups. The prices are those of 1952.

The increase of "manure and fertilizers" is of course principally an increase of compound fertilizers. The Bulletin states: "Although the least profitable crops received, on the average, more farmyard manure than the most profitable ones, they had over 50% less fertilizers and lime per acre and considerably less manurial residues from previous years than the high-profit crops."

Number of farms studied	15	14
Average cost per acre of manure and fertilizers	£11. 6. 0	£16. 12. 0
Average yield per acre, POTATOES	8 tons, 8 cwt.	10 tons, 6 cwt.
Average value of crop per acre	£24	£103

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THE JOURNAL OF THE MINISTRY OF AGRICULTURE

VOL. LXI

No. 9

DECEMBER 1954

CHEMICAL SPRAYS AND POULTRY

N. DOBSON, B.Sc., M.R.C.V.S.
Ministry of Agriculture and Fisheries
Veterinary Laboratory, Weybridge

Experiments at the Ministry's Veterinary Laboratory, carried out under the aegis of the Agricultural Improvement Council, suggest that, in certain circumstances, the exposure of poultry to grassland or orchards regularly sprayed with some common chemical sprays may lead to a serious drop in egg production.

THE use of a number of the more recently introduced selective and other weed-killers to control weeds in grassland and agricultural crops, and the spraying of fruit trees with various preparations to control certain insect pests, are now commonplace in our farming practice. Farmers, generally, are fully conversant with their use and the primary effects to be expected. From time to time, however, fears are expressed about the possible toxic effects of some of these chemicals on small livestock which may accidentally come into contact with them. Poultry, for example, may range over the grasslands and orchards following these treatments, and naturally poultry-keepers are anxious to know the potential danger of these substances to their stock.

In orchards there is always the factor that the amount of the active agent falling on the ground is completely unknown, due to the drip from the trees during and after spraying. Accordingly, to resolve these doubts the Agricultural Improvement Council decided to initiate some experiments at the Ministry's Veterinary Laboratory at Weybridge with the object of ascertaining the possible toxic effects, if any, of certain chemical sprays in

A Happy Christmas
and
A Prosperous New Year
to
all our readers

CHEMICAL SPRAYS AND POULTRY

fairly general use. The five substances chosen were MCPA, 2,4-D, 2,4,5-T, sodium chlorate, and tar distillate winter wash. Each was used at the strength recommended by the maker and again at either four or ten times that strength.

The birds in the experiment were housed in fold units on new leys which had not been used previously for poultry. The grass during the whole period was not more than 2-3 inches high. The units used were of the type having a slatted floor house and trap nests, and each house had a run of 8 square yards. Twenty two-year-old Rhode Island Red hens and two male birds of the same breed were placed in each house. They were weighed individually at the beginning of the experiment and at each subsequent stage. The houses were moved each morning, and the same area was not used again throughout the whole experiment.

During the first four weeks the birds were under observation for production of eggs, health conditions, etc., and all the eggs produced were incubated, either for the production of embryos or for chicks for use at the laboratory. Hatches were normal, producing good chicks which reared well. Following this, the birds were weighed and the spraying of the grass began and continued daily for fourteen consecutive days. During this period of spraying little rain fell during the day, but there were regular dews.

At ten o'clock every morning the birds were driven into the house, food and water containers were removed from the fold, and the chemical agents were sprayed over the grass of the run. Immediately following the spraying, the birds were released from the house and driven back into the run. Two houses were used for each treatment. The grass in one fold was sprayed with the chemical at the strength recommended by the maker, and the grass of the other fold was sprayed at either four or ten times the normal strength. Four houses, each containing twenty hens and two cocks, were maintained as controls. Spraying began on April 27 for four groups and on May 7 for the fifth (2,4,5-T).

The five agents were used in the following strengths:

		Normal	Strong
MCPA	(23 per cent of the active agent)	$\frac{1}{2}$ oz. to 1 gal. water	2 $\frac{1}{2}$ oz. to 1 gal. water
2, 4-D	(32 per cent dichlorophenoxyacetic acid)	$\frac{1}{2}$ oz. to 1 gal. water	2 $\frac{1}{2}$ oz. to 1 gal. water
2, 4, 5-T	(15 per cent of the active agent)	$\frac{1}{2}$ oz. to 1 gal. water	2 $\frac{1}{2}$ oz. to 1 gal. water
Sodium chlorate		$\frac{1}{2}$ lb. to 1 gal. water	2 lb. to 1 gal. water
Tar distillate winter wash	(30 per cent cresol and phenol as the active agents)	$\frac{1}{2}$ pt. made up to 1 gal. with water	2 pt. made up to 1 gal. with water

Serious Drop in Egg Production During the first five days of spraying the most noteworthy features in the birds of all groups were the immediate increase of about fifty per cent in the consumption of water and the change in the droppings on the second day to a soft consistency of a putty colour. These features persisted for 3-4 days; the birds' habits then returned to normal. Throughout the period of spraying no bird showed any symptom of ill-health and all remained normal in appearance, although the sprayed grass was closely cropped every day. At the end of fourteen days spraying ceased, the birds were weighed, and the units were moved to another field.

CHEMICAL SPRAYS AND POULTRY

The birds were trap-nested during the whole period of the experiment and the eggs recorded to the individual, except for those laid on the ground, which were attributed to the unit. The eggs were incubated weekly and records were kept of fertility and hatchability. Some of the chicks so produced were kept under observation throughout the growing period until they came into production. The final record of the eggs produced, showing the percentage increase or decrease during and after the spraying period, is given in the following table.

Group	Chemical Spray and Strength	Egg Yield in Week before Spraying	PERCENTAGE INCREASE OR DECREASE			
			First Week of Spraying	Second Week of Spraying	Week after Spraying (compared with yield before spraying)	Overall (compared with controls)
A	MCPA N	90	+2.2	-7.8	-6.7	-20.7
	10 N	85	+8.2	+1.2	-10.6	-27.0
B	2,4-D N	86	-8.1	+2.3	-8.1	-22.1
	10 N	57	+14.0	-8.7	+8.7	-7.7
C	N	74	-18.9	-37.8	-45.9	-59.9
	Sodium chlorate 4 N	69	-13.0	-68.1	-73.9	-90.3
D	N	80	No change	-1.2	-2.5	-16.5
	Tar distillate winter wash 4 N	90	-12.2	-27.8	-30.0	-46.4
E	2,4,5-T N	79	-5.1	-11.4	-22.8	-8.5
	10 N	82	+4.9	-13.4	-28.0	-18.2
—	Control to A & B	57	+10.5	-5.3	+14.0	—
	Control to C & D	73	+12.3	+2.7	+16.4	—
—	Control to E	63	-14.3	+3.2	-14.3	—
		82	-8.5	+3.7	-9.8	—

N = chemical used at normal strength

10 N and 4 N = chemical used at ten and four times normal

These figures show a varying decline in production, either during the period when the birds were subjected to the agents or during the week after spraying ended. In all groups the loss in egg production was serious, but especially in those subjected to sodium chlorate and the stronger concentration of tar distillate wash. In the controls to Group A, B, C and D, the production was rising, whereas in the controls to Group E (where the experiment took place a few weeks later) it was declining, doubtless due to the onset of the period of naturally lower production.

During the spraying period all the eggs were incubated and hatched. Fertility and hatchability were good, with the exception of those produced by the groups treated with sodium chlorate. In these two groups the hatches were poor, "sticky", and some had abnormal yolk sacs, but the chicks which survived were good and reared normally, producing good birds up to

CHEMICAL SPRAYS AND POULTRY

fourteen weeks old. The chicks from the other four groups reared very well and were mainly disposed of at fourteen weeks old. Some were retained and came into production at about 5½ months ; chicks produced from their eggs hatched normally and reared well.

Assessing the Effects In assessing the toxicity of these products, it must be remembered that daily contact with these chemicals for fourteen days, even at the strength recommended by the makers, was abnormally severe and would not (or rarely ever) occur in normal practice. However, the original objective of the Poultry Group of the Agricultural Improvement Council was to demonstrate that even this repeated exposure would lead to little or no ill-effects. Unfortunately, this did not prove to be so.

It can be seen from these results that, with this continued exposure, sodium chlorate, even at the normal concentration, caused a marked loss of weight, decreased fertility and hatchability, and reduced egg production by 60 per cent (by 90 per cent at the stronger concentration). A similar loss of weight occurred with 2,4,5-T, which also reduced egg production at normal strength by 9 per cent and by 18 per cent at the stronger concentration. Fertility and hatchability were not affected by 2,4,5-T. Of the other three sprays, 2,4-D caused a 22 per cent loss of egg production at normal strength and 8 per cent at ten times the normal ; MCPA led to a reduction of 20 per cent at normal strength and 27 per cent at the greater concentration ; tar distillate winter wash resulted in a loss of 17 per cent at the normal strength and 46 per cent with the stronger concentration. None of these preparations had any effect on weight, fertility and hatchability.

LUCERNE SEED GROWING

A. ZALESKI, M.A.

National Institute of Agricultural Botany, Cambridge

There is considerable evidence that the lack of a proper technique of seeding and harvesting lucerne is mainly responsible for the low yield and poor germination of home-grown lucerne seed.

THE management of lucerne for fodder production does not usually provide conditions suitable for seed production in this country, and as in England lucerne seed is normally a by-product of a lucerne ley, that is often the main reason for failure. The climate, too, is usually blamed for low yield and poor germination of home-grown seed, but there would appear to be many other factors besides climate which influence seed setting and its germination. To get some idea of the problems confronting lucerne growers in this country, and to find out the present methods of management and technique of harvesting and threshing, a survey on lucerne seed production was conducted during 1951-53. Over twenty growers in the east and south of England were visited each autumn : the findings of this survey are given below.

Climatic conditions vary from county to county, but on the whole the east and south-east of England, where most of the crops are, has a dry climate (average yearly rainfall of about 25 inches, most of it coming during winter). Droughts are not uncommon in the spring and summer, while the autumn, and especially October and November, is frequently wet. The

LUCERNE SEED GROWING

large number of wet days with high relative humidity in October and November often makes the drying of the late crop very difficult. The amount of sunshine is high, especially near coastal areas in the east and in Kent and Sussex, but while the summer is usually warm and dry, winter and spring are often cold. Nevertheless, a climate with a comparatively low rainfall and high sunshine record is generally considered to be favourable to lucerne seed production.

In 1950 a seed firm arranged for a number of growers to sow down the Du Puits strain for seed production, and this firm co-operated in the survey by providing a list of the growers and all other data required. Local National Agricultural Advisory Service officers also provided information in 1951 and 1952 about a number of seed crops, and, finally, useful material was obtained from a number of growers seeding their own stocks.

Each year, information was collected from about twenty-five growers, covering a total of 400 acres. About 15 per cent of this failed before the lucerne was harvested, owing to late sowing, competition of weeds, rabbit, pigeon and sheep damage. As much as 30 per cent failed completely during the harvest where a combine was used or where the crop was harvested in late October and November; this was due either to sprouting in the field or to the crop being so wet that it was not possible to save it. A further 20 per cent of the crops partially failed during, or after, the harvest.

Management in Year of Sowing The type of soil met with in the survey varied from light soil on chalk or gravel to heavy clay. Drainage, with one or two exceptions, was satisfactory. Soil acidity was generally adequately corrected by an application of lime before sowing; potash and phosphate were also applied to land deficient in these minerals. The actual dressing of fertilizers was rather generous, but it varied from farm to farm and, in the year of sowing, it ranged from 3 to 6 cwt. superphosphate and from 2 to 4 cwt. muriate of potash per acre. On a few holdings a compound fertilizer containing 10 per cent nitrogen was applied at a rate of up to 10 cwt. per acre. No farmyard manure was given, but in one instance dried poultry manure was used.

On lighter land lucerne was usually sown in April or early May, both with and without a nurse crop. In several instances, especially on heavy land, it was sown in July on fallow. Stiff-strawed corn was used as a nurse crop, and mostly the seed rate of the corn was slightly reduced. All seed was inoculated before sowing.

The seed rate in the case of crops being grown on contract ranged from 3½ to 10 lb. per acre, the seed being drilled in rows 12-24 inches apart. With the exception of one or two crops, which failed owing to the late sowing and weed competition, all crops established themselves very well and the nurse crops did not interfere with or affect establishment. Other growers used a seed rate of 17-20 lb. per acre, some seed being broadcast and some drilled in rows 6-12 inches apart. Where a low seed rate was used, the density of the crop was normal, but with a high rate the crops were rather too dense. The crop was usually laid at harvest time and the second growth interfered with harvesting.

In the autumn of the sowing year lucerne was in most instances left to die down, but occasionally, where it came to flower in August, the crop was "topped" at the end of October to prevent seeding.

Treatment in the Harvest Year The majority of growers gave only a small fertilizer dressing in the spring of the first harvest year, but a few used 2-3 cwt. superphosphate and 1-2 cwt. muriate

LUCERNE SEED GROWING

of potash. In subsequent years, the average dressing was 2-3 cwt. super-phosphate and 1-2 cwt. muriate of potash. Practically all the growers took the first cut for drying, silage or hay, usually during May : a few cut it as late as mid-June, and two growers took two cuts and left the third crop for seed. In 1952 and 1953 two growers did not take a cut in the spring and left the first growth for seed.

The peak of flowering seemed to come in most cases in July, but where the crop was cut late in the spring, it was flowering in September or October.

Crops were inspected at the end of September and the beginning of October : only two crops were harvested by this time. There was no second growth on light soils and crops were standing well, while on heavy land there was very little second growth (not more than 3-4 inches) and crops were also standing well. All crops which were cut in the first fortnight in May had 60-70 per cent brown pods. Plenty of pods were formed, giving the impression that a heavy yield of seed could be expected—an impression equally shared by both growers and the writer in 1951 and 1952. In 1953 only a few growers were seeding their crops, and these were less developed than in the previous two years. Far fewer pods were formed than in the previous year, probably owing to the cold spring, the wet, cold summer, and the very low sunshine record. Nevertheless, there was only a little second growth at the time of inspection.

Those crops which were cut as late as June had a considerable amount of second growth; most of the plants were still flowering and the few pods formed were quite green. It was the same with two crops damaged in early spring by pigeons, rabbits and sheep : the first growth suffered damage and the second growth was abundant, reaching flowering stage at the end of September. For these reasons, they were not seeded.

The general impression was that crops were much thinner in their third harvest year than in the second. Naturally, taking cuts for fodder and seed exhausts the crop and thins the stand considerably. A few growers who broadcast their crops at a high seed rate expressed the opinion that when the stand got thinner in the fourth year they were able to get a more reasonable yield of seed.

Methods of Harvesting and Threshing With few exceptions, the crops were harvested late in the season, mostly during October and throughout November. The second growth was coming through the seed crop and a great amount of seed was lost by sprouting and shedding. Sprouting takes place at that time of year, even if the crop is still uncut, and it is usually disastrous when a crop is cut and left on the ground, if only for a day or two. The beating of the rain and wind on the ripe pods causes them to drop to the ground, and the seed is lost. Also, owing to dampness of straw, most crops which were stacked went mouldy, and in a few instances all the seed was lost.

The four main methods of harvesting a crop were : (1) by direct combining ; (2) cutting with a binder tying small sheaves, stacking and threshing during the winter ; (3) cutting with a mower, or throwing out loose with a binder. After turning the swaths by hand, they were made into cocks and then stacked and threshed later ; (4) after cutting with a mower or binder, putting up the crop on tripods the same day. The crops were either threshed direct from the tripods, using a small combine, or were stacked and threshed later.

Actual yield per acre varied from 4 cwt. to nothing, according to the time the first cut was taken in the spring, local weather, and the time and method

LUCERNE SEED GROWING

of harvesting and threshing. It was not possible to obtain the yield figure from some growers who harvested or threshed only part of a crop. Although the average yield of clean seed over three years was 1.0-1.3 cwt. per acre, a few crops yielded 4 cwt. per acre.

Seed crops harvested in the late autumn had a high moisture content and were dried by either growers or merchants. The final germination, including hard seed, varied from crop to crop, and it reflected the conditions which a seed crop experiences during and after harvest. It ranged widely from 54 to 98 per cent.

The Fodder Cut Three outstanding factors emerged from this survey which greatly affect the yield of seed. Fortunately, they can be controlled by the grower. The first concerns the time of the fodder cut. If a first cut is taken, it must be early in the spring, thus sacrificing half the usual weight. All crops which were cut in June failed to produce seed; they were still flowering in October and the pods formed were green.

In a normal year the summer is dry and the hours of sunshine high. Sunshine and low humidity during the flowering period are essential for seed setting, as White (1) and many other investigators have shown. Unless the crop is left uncut in the spring, or cut not later than the beginning of May, the peak of flowering will not come until the end of summer or the beginning of autumn, when the weather is unfavourable for seed setting and ripening. The lucerne seed grower, like the grass seed grower, has to make up his mind to concentrate on seed production and to sacrifice fodder. If he endeavours to combine seed and fodder production, he must be prepared to accept a low yield of seed, or even failure.

The results of two years of investigation on seed production at the National Institute of Agricultural Botany show that the highest yield is obtained when no cut is taken and the first growth is left for seed. In 1952, two growers who left part of their field uncut and seeded the first growth had no trouble with the second growth, and they were able to thresh their seed direct from tripods, using a small combine, by September 25. The yield was between 4 and 5 cwt. of seed per acre. In 1953 one of them had to leave his crop until the end of October and then combine direct. Naturally, the crop was over-ripe and most of the seed was lost, but even so it gave 1 cwt. per acre of clean seed. The other farmer, in spite of a bad season obtained 2 cwt. of seed per acre.

Time of Harvesting and Crop Spacing Individual farmers may disagree on *methods* of harvesting, but surely we all agree that to harvest any fodder crops for seed in this country at the end of October or during November is asking for trouble. Nevertheless, most of the growers have been delaying the harvest of their lucerne seed crops into late autumn, when wet weather makes harvesting and drying impossible. It must also be realized that, as the period of flowering of lucerne lasts about two months, the first flowers will produce pods early, but by the time the last pods ripen all the first pods may be lost. One grower in 1952 who left the first growth for seed and waited for 100 per cent ripe seed had the second growth coming to flower by October, while the seed crop was down beneath it. It is a mistake to wait until all the pods get brown; it is much safer to harvest the crop in reasonable weather when 60-80 per cent of pods are ready.

An experiment conducted at the N.I.A.B. on the relation between stage of seed maturity at harvest and its yield and germination indicates that 60-80

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per cent is the safest stage for harvesting lucerne seed. The delaying of harvest beyond this stage gives time for the second growth to develop, which will not only interfere with harvest, but will often make drying impossible. In October and November, when relative humidity is very high and the crop is never dry, lucerne seed will sprout even in the field, especially if the crop is thick. This is especially common with broadcast or close-drilled crops, where seed rates up to 20 lb. per acre are used.

Further N.I.A.B. experiments with wide-drilled and close-drilled lucerne at a low seed rate showed that the yield from a wide-drilled crop is higher than that from a close-drilled one. The light can penetrate easily to a crop in wide-drilled rows and, at the same time, when plants reach the pre-bud stage they still form a very good canopy to keep weeds and second growth down. In a close-drilled crop the competition between plants for light, food and space prevents them from forming as many pods, delays ripening, and may cause sprouting later in the season. Tysdal ⁽²⁾ showed the benefit on the yield when a crop is widely spaced, as compared with a close-drilled crop. For the same reason, Zimmerman ⁽³⁾ in Germany advocates even single-spaced plants for seed production.

Tripoding the Best Method Nearly every crop harvested by direct combining during the survey was a failure. On one farm where it was successful, the grower dried the seed and unthreshed pods by cold air as they came from the combine, and threshed them again. However, the growers who used direct combining took the first cut in spring for fodder and harvested their crops too late in the autumn. Direct combining with pre-harvest chemical defoliant spray has been practised in North America with success, and it is at present under investigation in this country.

The harvesting of crops with a binder or mower, tying into small sheaves, then stacking or leaving the cut crop loose, hand turning or cocking, then stacking, failed partly or completely, owing mainly to the weather experienced in October and November. Stacking of lucerne is a rather different matter from stacking clover. The lucerne crop, when cut at the end of October or during November, will nearly always contain a certain amount of the second growth. The amount of green stems and leaves is very high, and the risk of heating in the stacks is much greater than in the case of clover. This could account for the complete loss of crops or very low yield and poor germination of stacked crops.

Using tripods and threshing the crop direct from tripods proved to be the best method. Handling and danger of sprouting is reduced to a minimum and the crop has the best opportunity of drying quickly. For these reasons, the best yield and the highest germination were secured where this method was used.

Choice of Strain In view of our climate, the early strains have the best possibilities for seed production in this country. The writer ⁽⁴⁾ and ⁽⁵⁾ has shown that the Flamande type, including Eynsford, an English strain, is the earliest in time of flowering. The results of an investigation (in progress) at the N.I.A.B. indicate that in these strains the flowers are more readily tripped than others and that the amount of seed eventually produced is greater than that of mid-season or late strains under comparable conditions.

It should, however, be noted that the breeders and selectors of some French strains are protected by certain agreements, and their strains cannot be used for further multiplication without their agreement. Those intending

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to grow seed crops of lucerne are strongly advised to obtain an authentic stock of seed from the breeder or official agent. Advice on authentic stocks of seed and technique of seeding lucerne can be obtained from the Seed Production Branch of the National Institute of Agricultural Botany.

Summary and Conclusions

1. When the first cut was taken before the middle of May, the peak of flowering came in July and the crop was fit for cutting (about 60-70) per cent brown pods) between the middle of September and the beginning of October. When the first cut was taken at the end of May and the beginning of June, the peak of flowering came towards the end of August, and the seed crop was not ready until November. In a few instances where the crop was cut in June or two cuts were taken, comparatively few pods formed and the crop never became fit for harvest.

2. Good weather during the flowering period is essential for seed setting, and unless the crop is cut not later than early May or left uncut in the spring, the peak of flowering will come by the end of summer or the beginning of autumn, when the weather is usually unfavourable for seed setting and ripening.

3. On the whole, where the weather at the time of flowering was reasonable, seed was well set and crops gave the impression at the end of September that a good yield could be expected. The crops were standing well and there was no trouble with the second growth, especially on poorer soils and where the seed rate was not more than 4-10 lb. per acre and row width was not less than 12-24 inches.

4. Direct combining in October and November proved to be unsatisfactory owing to the dampness of the seed crop.

5. A number of growers who stacked their crops after harvesting lost some of their seed during drying (windrows, cocks) owing to sprouting, and lost most or all of the remainder due to the further sprouting and heating which took place in the stacks.

6. A few farmers who used tripods (especially those who took the first cut very early in spring or sacrificed this cut altogether) succeeded in harvesting the seed crop during the first fortnight of September and averaged 4 cwt. of high-germinating seed per acre.

Most of the crops were harvested too late in the season (October or November) when the humidity was extremely high, and sprouting took place regardless of methods of harvesting and handling the crops. Also, when the crop was left too late in the year, shedding took place, not so much of seed from pods as the falling of whole pods on the ground, and the second growth of foliage (especially on heavier and fertile soils) was abundant. These are the main reasons either for complete failure or for low yield and poor germination.

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SOME ASPECTS OF GUERNSEY FARMING

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Despite the high density of population and the demands of the glasshouse growers, there is a small but thriving dairy industry in Guernsey, concentrating primarily on the production of milk for the liquid market, and the breeding of Guernsey cattle.

THE first impression of visitors who come to Guernsey by air is that of an island almost completely covered with buildings and greenhouses. In fact, they are often rather surprised to learn that in this area of intense development there is room for a thriving farming industry. The 1951 census showed the Island to have a population of approximately 43,500 in 12,692 households on approximately 25 square miles, giving a density of 1,740 persons per square mile. In addition, an area of 1,037 acres is covered with glass (as at December 1, 1953). Out of the land mass of 16,000 acres for the whole of Guernsey, there remain only 5,124 acres used for dairy farming (June 1953 census), while possibly a further 2,500 acres are either cultivated and used for market gardening or horticulture, or are used in connection with greenhouse properties. There are no statistics available to show the exact area.

Farming activities are confined almost entirely to dairy farming and breeding Guernsey cattle. Most farmers have an area of glass, and flowers (mostly narcissi and iris), both for flower production and propagation (mainly for export), are an important sideline on many farms, although there are very few specialist flower-growers on the Island. The area of flowers in 1953 was estimated at 600 acres. Pigs, poultry and market gardening have a small place on a few farms, but again the number of specialist producers is very small. There are no sheep in Guernsey.

Over much of the Island the soil bears little relation to the parent rock, much of which is of Gneiss, Diorite or granite formation. A great deal of the parent rock is overlaid by a light loam soil, much of which is similar to the brickearths; this varies in depth from twenty feet down to a few inches. Where the soil is thin and overlies the Gneiss, it is usually gravelly or stony. Most soils are free-draining and very acid, but when limed they are highly fertile and respond well to manuring.

Extremes of temperature in the Island are rare. Autumns and winters are mild, and the comparative freedom from frosts before the new year strongly favours the growth of winter grass. The average annual rainfall is 36 inches, and average figures over the past hundred years or so indicate that just under 50 per cent of the rain falls in the four months from October to January. This high autumn and winter rainfall, combined with the free-draining nature of most soils, causes severe leaching of nitrogen and, in spite of the mild winter temperatures, the winter growth of such grasses as Italian, H.1, or Westernwold ryegrass can be encouraged only by frequent applications of nitrogen. Guernsey has an average of 1,885 sunshine hours per year (fifty-seven year average).

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Cattle on Small Farms The Guernsey breed of cattle is the only one allowed on the Island. No live cattle may be imported, and once an animal has left the Island it cannot be brought back ; consequently, no breeder can take his animals to the British shows and bring them back to the Island afterwards. These restrictions on the movement of cattle do not apply, of course, to movements between the islands of Guernsey, Alderney, Sark and Herm.

Almost all the cattle on the Island are either pedigree or foundation stock. The Royal Guernsey Agricultural and Horticultural Society carries out an approval scheme for bulls. Once a bull reaches the age of 15 months and has been passed by the Society, any farmer may take his cows to that bull for service, and the owner of the bull cannot refuse service to any cow provided it is healthy. A bull may, however, be inspected at 12 months old, and if it is approved it may be used up to the age of 15 months for the farmer's own stock.

The dairy farming land of Guernsey is occupied by no less than 349 farmers, giving an average area per holding of 14.9 acres. The classification of holdings into size at the time of the June 1953 census was as follows :

Area of Holdings acres	No.
0 — 6	72
6 — 8	29
9 — 12	68
13 — 16	49
17 — 20	35
21 — 24	37
25 — 28	26
29 — 32	10
33 — 36	8
37 — 40	7
41 and over	8
Total	349

Unfortunately, in addition to the very small size of the farms, fields are very scattered and many farmers have to lead their cattle long distances by road to their pasturage. In the absence of any law on agricultural holdings in the Island (legislation on this matter is being prepared), rented land frequently changes hands. This is not in the best interests of economic farming, particularly as there is a high proportion of rented land, as shown by the following figures.

Type of Holding	per cent
Wholly owned	16.4
More than 50 per cent owned	18.6
Less than 50 per cent owned	34.4
Wholly rented	30.6

Because land is scarce on the Island, rents are high, varying from £7 to £10 per acre.

To illustrate further the extreme small size of the holdings, it may be pointed out that 286 holdings, or 82 per cent of the total, have herds of under ten cows, and 53 holdings (15 per cent) keep between ten and fifteen cows. There are only 10 farms, or 3 per cent of all the holdings, with over fifteen cows.

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The number of cattle was shown in the June 1953 census to be :

Bulls 12 months and over	93
.. under 12 months	..	..	..	..	..	46
Steers .. .. .	..	..	..	..	..	14
Cows .. .. .	..	..	..	..	..	2,179
Heifers 6 months and over	..	..	..	..	..	1,300
Heifers under 6 months	..	..	..	..	..	426
Total, all cattle						4,058

Farming Practice The majority of cattle on the Island are still tethered, although many of the bigger Island farmers are changing to strip-grazing, using the electric fence. While tethering should be the ideal method of grass utilization, in actual practice it causes severe overgrazing at the extremity of the tether. It is the custom to allow a cow a 12 foot tether (450 square feet), but much more even grazing can be obtained if the tether length is increased to 15 feet and the number of "shifts" per day reduced accordingly.

Of the 5,124 acres of dairy farming land in 1953, 2,385 acres were in permanent pasture, 1,725 acres were in leys under seven years old, and 1,014 acres were cultivated, mostly for grain and fodder crops for cattle. A total of about 430 acres of wheat and oats is grown every year, but in spite of the excellent yields obtained, the very small size of the fields (usually 1-2 acres) makes large-scale cereal production uneconomic. A small area of cereals will always be grown, however, mainly for straw for bedding, since imported straw can rarely be bought at less than £8 per ton.

Turnips, swedes and mangolds are grown by most farmers. Fodder beet, which seems to provide an excellent supplement to winter grass, is quickly gaining in popularity. Parsnips and carrots are still grown and are held in high repute for milk production, but because of the high labour cost involved in these crops the annual acreage is declining. Kale is grown extensively : it is either singled or transplanted, and most farmers prefer to cut and cart the kale and feed it in the stables. The variety Choumollier is favoured, as the stems are softer than most marrowstem kales and it retains its leaf better in winter.

Silage (mostly grass) has become very popular, and many farmers are making pit silage. A recent addition to the methods of grass conservation has been the installation of a small grass drier of the single-tray type.

More and more Guernsey farmers are realizing that grass is by far the most important crop to the dairy farmer, and since the war the short-term ley, based on H.1 New Zealand short-rotation ryegrass—late-flowering red clover—S.100 white clover, has almost completely replaced the traditional Italian ryegrass—broad red clover ley. Under the mild winter climate of the Island, short-rotation ryegrasses have been of great value because of their winter growth. Many farmers are now sowing a catch crop of Westernwoltz ryegrass in August, and when the crop has been fed with a nitrogenous fertilizer two or three times during the winter, as many as six winter bites have been taken before the beginning of May.

Guernsey farmers place great value on liquid manure, and it is collected on most farms and applied to the ground during rainy weather in the winter and spring. This provides a valuable supply of nitrogen and the response can quickly be seen, particularly on new leys containing a high proportion of short-rotation and perennial ryegrasses. A lot of seaweed (vraic) is also carted in the winter and spring for use as a substitute for farmyard manure.

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The Guernsey practice is to spread the vraise straight on the land and plough it in after it has been rotted slightly. But carting vraise is a costly business and the practice is declining.

Guaranteed Prices for Milk Prices to producers are not guaranteed by the States for any agricultural product except milk.

In regard to milk, the second five-year policy of guaranteed prices since the war is now in operation. The price structure for this commodity is based on the cost of production (from twenty costed farms) plus 4d. per gallon profit. The average price fixed for all farmers collectively for the year May 1, 1953, to April 30, 1954, was 4s. 8d. per gallon for milk required to meet the demands of the liquid market. Any production in excess of these demands was paid for at manufacturing prices. An even supply of milk throughout the year is encouraged by a seasonal variation in the price paid to farmers, the prices varying in the year quoted above from 4s. 1d. per gallon in April to 5s. 2d. per gallon in the winter months.

During 1953 there was a large spring and autumn milk surplus (that is, surplus to liquid requirements) and this resulted in an overall reduction in the seasonal prices varying from $\frac{1}{2}$ d. to 2d. per gallon. In the winter months of 1953-54 sufficient milk was produced to meet the liquid demands at that time, but during the summer visitor season of 1953 some milk had to be imported. Throughout the whole of 1954 there has been a substantial increase in production. For the first time since the war, the Guernsey farmer has supplied sufficient milk to meet all the liquid requirements throughout the whole year. The spring and autumn surplus in 1954, however, reached almost unmanageable proportions. Most of this had to be manufactured into butter at an uneconomic price, causing a reduction in the seasonal prices of up to 4 $\frac{1}{2}$ d. per gallon.

The over-production of milk on the Island has now become a very serious problem and this, together with the poor returns from eggs and pork, is causing considerable anxiety for the whole future of farming in Guernsey. Many farmers are meeting this situation by building more glass and expanding the tomato-growing side of their properties. Although economically this is the only wise course for the farmer to follow, the overall effect on the Island is to change it into one vast metropolis.

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POULTRY-KEEPING IN CYPRUS

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As the result of the work of the Government Poultry Breeding Centres and the successful introduction of a number of development schemes, poultry-keeping in Cyprus is beginning to emerge from the primitive obscurity of the backyard into a large-scale and modern commercial enterprise.

CONSIDERING its relatively small size, Cyprus has quite a large poultry population, comprising about $1\frac{1}{2}$ million chickens and 50,000 turkeys. Geese, ducks and guinea fowls are also kept in some parts of the Island. Total egg production is estimated at 75 million annually, selling last year at an average retail price of 3s. 6d. per dozen. The breeds consist mainly of Rhode Island Reds and their crosses, indigenous breeds, and—the most recent—Light Sussex. Rhode Island Reds were introduced about twenty years ago and have acclimatized themselves very well. The native stock includes the Cyprus Black, the Minorca or Malta Black, and a host of mixed breeds and crosses of the light Mediterranean type: the Malta Black was brought to the Island about nine years ago; the Cyprus Black has been the result of about fifteen years of local selective breeding. The Light Sussex was introduced in 1951 and has become very popular for egg production, crossing and table purposes.

Until recently, very few attempts were made in Cyprus at pure breeding or large-scale commercial egg production, the usual practice being to keep 10–20 birds on free range. This so-called “free range” often meant the backyard, the manure heap, or the neighbour's garden. Under this system the birds forage a high proportion of their food.

In the past, too, housing often consisted of dark, badly lit, unventilated mud-brick houses. These were frequently infested with ticks and other parasites, which naturally had a detrimental effect on the health and laying capacity of the birds. Fowl pest (Newcastle disease) first made its appearance in Cyprus about four years ago, but it is being kept under control as a result of systematic vaccination of every bird.

The climate of Cyprus is extreme. The winters are cool and wet and the summers hot and dry. Winter and spring conditions are good for egg production and chick-rearing, and chicks are now being reared extensively in “hay boxes” without any form of artificial heat. Rearing generally ceases at the end of May, since chicks hatched after this date often fail to thrive in the excessive heat. It is during the summer months (June–September) that particular care and attention are needed in management, for at this time shade temperatures are often 100°F. or more. To maintain the laying stock in good health and productivity, adequate shade must be provided, either by trees or special structures. It is also necessary to keep the drinking water in a cool, shady place. From June until the first rains in October or November, natural vegetation on non-irrigated lands disappears, and this results in quite serious vitamin A deficiency unless some green food, such as fresh lucerne, is hand-fed daily or grassmeal is included in the balanced rations.

One serious problem which has retarded poultry development is the lack of proper poultry control in the villages. The system of scattered farmsteads, as we know them in the United Kingdom does not exist in Cyprus. The Cypriot farmer, in common with his counterpart in many other Middle

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East countries, prefers to live in a village community. Practically every household keeps some poultry, which are allowed free range in the streets and backyards. The control of breeding and disease is therefore a difficult problem. However, in recent years some of the more progressive poultry-keepers have realized the value of isolation and control of their stock by better housing, fencing, etc., and, as a result of this changed outlook, it is hoped that the recently introduced deep-litter system will become popular.

Three Government Breeding Centres All Government development schemes for poultry are connected directly or indirectly with the three main poultry breeding centres—at the Government Farm, Athalassa, the Government Farm, Morphou, and the Rural Central (Agricultural) School, Pergamos. The oldest and largest of these centres is the Athalassa unit, where a modern hatchery was started last year. Experiments and trials in breeding, nutrition, and systems of poultry husbandry new to the Island, such as deep litter and laying batteries, are also carried out at this centre. Egg production, fertility, hatchability and rearability figures are as good as those obtained in the United Kingdom.

The breeds of poultry kept at the breeding centres include Rhode Island Red, Light Sussex, Malta Black, and Cyprus Black. Both pure-bred birds and crosses are raised: the crosses are mainly Rhode Island Red \times Light Sussex (for sex linkage) or Cyprus Black \times Rhode Island Red or Light Sussex. The last-mentioned are distributed to certain villages where the environment is far from ideal and demands a laying bird which combines the stamina of the indigenous breed with the high productive qualities of an exotic breed.

Considerable importance is attached to turkey-rearing throughout the Island, and to maintain good supplies of hatching eggs, poults and stags for breeding, the Government keeps several breeding flocks of American Mammoth Bronze, American Broad-breasted Bronze and American Small Beltsville White. The foundation stock of the last two breeds were imported by air from a well-known Scottish breeder about three years ago. Ducks are increasing in popularity, particularly the Aylesburys, which are used for the catering trade. Aylesburys and Khaki Campbells are maintained at Government Stations. Bantams and guinea fowls are also kept throughout the Island, but are of no great economic importance. Some Indian Game can still be seen—doubtless a relic of cock fighting—a favourite sport at one time.

Two modern (English-made) compound food manufacturing plants are in operation in Cyprus, supplying balanced poultry rations in mash or pellet form. Recently a new factory was built and equipped with the latest machinery from England for the processing of abattoir waste (blood, offal, etc.) to meat- and bonemeal, and bloodmeal. This provides a useful addition to the local supply of animal protein. Efficient balanced rations are provided at a cost of slightly less than £30 per ton. The ingredients available for poultry rations include barley, oats, bran, maize, lucerne meal, legumes (peas, beans, vetch, etc.), sesame, meat-and-bone, blood, carob, and carob germ meals, together with cod liver oil, dried brewers' yeast, mineral mixtures and antibiotics. During 1953 regulations were enforced to control the quality of balanced rations.

The use of balanced rations has not yet become widespread, and many poultry-keepers still prefer to use the all-corn (barley and wheat) diet, although the cost may be as high as for balanced rations. Progressive poultry-breeders, however, have found that good egg production during the winter is dependent on the use of properly balanced rations.

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Poultry Development Schemes The main schemes under Government administration and supervision are the Poultry Extension Scheme ; the Registered Poultry Breeders' Scheme ; the Cockerel Exchange Scheme ; and an arrangement for the distribution of day-old and partly-reared chicks. The Poultry Extension Scheme was begun in 1947, when three poultry instructresses were selected and trained. A year later they were each given a district comprising upwards of twenty villages. These became known as the Poultry Extension Area and, in fact, the whole scheme became a pilot project for poultry extension work. The duties of the poultry instructresses were to advise poultry-keepers on all matters relating to improved poultry husbandry, such as breeding, feeding, housing, hygiene and disease control. After five years it was decided to extend this scheme, and last year the Poultry Extension Area was considerably enlarged and each poultry instructress was made responsible for the management of a poultry breeding unit, in addition to her normal advisory duties.

In Cyprus the farmers' wives usually look after the poultry, so there is a need for female, rather than male, poultry officers. At present, most of the instructresses' time is taken up advising poultry-keepers and breeders on the rearing of day-old chicks and management problems. Each instructress owns a small car, which enables her to cover long distances on advisory duties at an economic rate. The Poultry Extension Area covers approximately three-fifths of the Island, but next year it is hoped to appoint two more instructresses so that the whole Island can be covered.

To encourage pure poultry breeding by private individuals, a Registered Poultry Breeders' Scheme was started in 1951. Participants have to comply with certain regulations regarding pure breeding, recording, housing, disease control and supplying the public with hatching eggs, day-old chicks or adult breeding stock. As an incentive, registered breeders get priority for Government breeding stock at reduced prices, as well as good advisory facilities. At present, there are twenty registered breeders in the Island.

Perhaps the most unusual scheme operating in Cyprus, however, is the Cockerel Exchange Scheme. Under it, large numbers of young, pure-bred cockerels are taken every year into certain areas where it is desired to make a quick improvement in the local indigenous strains by crossing with Rhode Island Red cocks. These are exchanged for the local cocks, which are then sold for the table. This scheme is very popular, the villagers being quick to appreciate the improved productive qualities of the R.I.R. strain.

During the winters of 1951 and 1952 a number of trials were run to ascertain the rearability of the day-old chicks supplied by the Government, which are raised mainly in hay boxes. These tests were a success, and last year it was decided to install a British-made cabinet incubator with an egg capacity of 5,632, in addition to the several 150-egg-size machines which were already in use. The first hatch came out of the new incubator on December 30, 1953, and now about 1,500 first-class chicks are being incubated for distribution every week. Most of the chicks are sold as day-olds at 1s. each, the remainder being reared to 6-7 weeks old for later distribution.

A New Commercial Spirit The demand for day-old chicks has exceeded all expectations. The extension of the Government breeding centres and the installation of the new incubator have resulted in a revolutionary change in poultry-keeping throughout the Island. The fact that more and better chicks are now available has introduced the commercial aspect into Cyprus poultry-keeping. Several people are already

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building new poultry units or making plans for large-scale egg production enterprises, deep litter systems or laying batteries. This applies equally to commercial table poultry (broiler) production. It appears that Cyprus is at last beginning to abandon her primitive backyard system of poultry-keeping and embarking on more progressive systems, with a distinct bias towards commercial enterprises.

One of the future problems is likely to be the supply of breeding stock, especially if large-scale commercial enterprises develop quickly. It is felt that there is need for a large commercial breeding and hatchery business, run by private enterprise, to supply the rapidly increasing demands of the Island and, if need be, to develop the potential export trade in day-old chicks to other nearby Middle East countries.

The latest information from Cyprus shows that the demand for day-old chicks has become so heavy that two more large cabinet incubators have had to be ordered. These are now being installed at Government Breeding Centres. It has also been found necessary to establish three more sub-centres to increase the supply of hatching eggs. The output of the three cabinet incubators is already fully booked for several months ahead.

THE HEADING OF BROCCOLI

FACTORS AFFECTING QUALITY AND TIME

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Observations of the effect of temperature and delayed transplanting on the time of heading and development of the curd in broccoli suggest that seasonal variation may be due largely to environment.

IN recent years considerable attention has been paid to the breeding and selection of improved strains of broccoli for the south-west of England, where the climate is suitable for production in winter and early spring. Stocks of Roscoff broccoli, originally introduced from a similar climatic region in Brittany and which produced heads in February and March, have been used to develop a series of strains which give a sequence of heading dates from early January to late April. These strains have been selected for desirable curd characters, such as colour, which should remain white until it is fully grown, shape, which should be compact and hemispherical, and freedom from bracts and flower-buds. In addition, the inner leaves of the plant should remain curved over the curd to protect it from frost and discoloration due to exposure⁽¹⁾.

In commercial crops, seasonal variation in heading time and quality has occurred, especially in the case of the earlier maturing strains. In some years the strain selected for heading in January has matured as early as November, and in other years as late as February, while the quality of curd has also varied widely. From a survey of crops of Roscoff No. 2 broccoli in 1949 and 1950, North and Squibbs⁽²⁾ estimated that between one-quarter

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and one-third of the plants never produced marketable curds. As there has been no detailed investigation of the effects of environmental factors on the development of the broccoli curd, the present observations were made in an attempt to assess their importance under field conditions.

Effect of Temperature on Heading and Quality Observations were made on crops of the variety Seale-Hayne A6, which were grown in west Cornwall during the years 1946-49, in an attempt to determine whether the time of heading and the quality of the curd was affected by the temperature during the period of vegetative growth. In 1946 and 1948 some plants developed heads in November, and the majority in December, whereas in 1947 and 1949 only a very few plants had produced heads before the beginning of February. In 1946 the majority of the plants produced large, well-formed curds, but in 1948 a considerable proportion were unmarketable, because of the premature breaking of the curd and the development of bracts.

Table 1 shows the mean monthly maximum and minimum temperatures recorded for Penzance, and Table 2 the amount by which the temperature varied from these figures in each of the seasons in which observations were made.

Table 1
Mean Monthly Temperature (deg. F.) at Penzance

					Maximum	Minimum
July	..	..	..	..	67.1	56.0
August	..	..	..	..	67.6	56.4
September	..	..	..	..	64.6	54.1
October	..	..	..	..	58.6	49.7
November	..	..	..	..	53.1	44.7

Table 2
Difference from Mean Monthly Temperature (deg. F.) in Particular Seasons

	1946		1947		1948		1949	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
July	-2.4	-1.9	-1.6	-1.3	-0.5	-1.3	+4.9	+1.2
August	-3.5	-2.8	+7.0	+2.2	-1.6	-1.5	+1.8	+0.5
September	-2.6	-1.2	+2.4	+0.7	-1.9	-1.6	+3.3	+3.4
October	-1.0	+0.9	+2.0	+0.3	-0.3	0.0	+2.6	+2.3
November	+1.6	+1.6	+2.3	+0.3	+2.7	+4.0	+0.3	+0.5

It will be seen that in both seasons (1946 and 1948) when the time of heading was earlier than normal for the strain, the temperature in July, August and September was lower than average, whereas in the seasons when heading was delayed (1947 and 1949), the temperature for the corresponding period was above average. In October the mean maximum temperature was below 60°F. in the two seasons when heading took place in November and December, but more than 60°F. in the two seasons when it was delayed until February. Finally, the temperature when the first plants were coming into head in November was considerably higher in 1948 than in 1946, when they were at the same stage.

Delayed Transplanting Retards Development Further observations on the same variety of broccoli indicated that the time of heading and the development of the curd were also affected by the time that the seedlings had remained in the seedbed before transplanting. All of the plants which were transplanted in July developed normal curds at the usual time of heading in January, but when trans-

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planting was delayed until September, a proportion of the plants continued in a vegetative state throughout the winter and either produced abnormal heads in the spring or summer or a normal curd at the characteristic time in the following winter. The percentage of plants which either developed normal curds, abnormal curds, or remained vegetative when transplanted on three different dates from the same seedbed, is shown in Table 3.

Table 3
Effect of Delayed Transplanting on Curd Development

Transplanting Date	Period in Seedbed <i>days</i>	Normal Curds <i>per cent</i>	Abnormal Heads <i>per cent</i>	Vegetative Plants <i>per cent</i>
July 20	87	95	2	3
August 16	112	79	8	12
September 1	131	55	19	26

The type of abnormal head appeared to be related to the time of the year when it developed, and three main types could be distinguished :

1. May-June
No true curd was formed, but a compact mass of flower-buds developed in its place at the apex of the main stem. The buds were borne directly on thick, primary inflorescence stalks, which later elongated.
2. July-August
The head consisted of many small isolated masses of curd, each surrounded by a large number of well-developed bracts.
3. September-October
Several branches arose from the main axis, each of which developed a vegetative bud.

In addition to its effect on curd formation, an extension of the period in the seedbed also caused a reduction in the size of the plant at the normal time of heading, as is shown in Table 4 for plants transplanted in July and September.

Table 4
Effect of Delayed Transplanting on Size of Plant

Transplanting Date	Period in Seedbed <i>days</i>	Height <i>inches</i>	Size on December 27		
			Lateral Spread <i>inches</i>	Stem Diameter <i>inches</i>	Curd Diameter <i>inches</i>
July 9	79	27	30	1.25	0.25
September 4	136	12	21	0.75	—

Some Conclusions There appears to be a correlation between the time of curd initiation and the temperature during vegetative growth. The early heading in 1946 and 1948, when temperatures were lower than average during the autumn, would be consistent with a requirement for low temperature to bring about the change from the vegetative to the reproductive state, similar to that in cabbage. (Miller (?)). The fact that delayed transplanting from the seedbed, which brought about an overall reduction in the size of the plants, also resulted in a number remaining in the vegetative state throughout the first winter, indicates that the plant may also have to reach a critical size before curd initiation can take place.

The development of abnormal heads in spring and summer is difficult to explain, unless it is assumed that these plants reached the critical size for curd initiation only after vegetative growth has been resumed in the spring, and that the increasing temperature and day-length at this time either suppressed curd formation or promoted renewed vegetative development in

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the form of bracts or true vegetative buds. Haine (*) reported that bracts develop rapidly when the inflorescence is subjected to high temperatures at the time of flowering, and it is also possible that above the optimal temperature for curd development there is an increased tendency for the curd to break up and for bracts to develop. This would account for the poor quality of the heads in 1948, when temperatures were higher than normal, after heading had started in the autumn.

An indication has been given of the possible effect of certain environmental factors on the commercial characters for which these broccoli strains have been selected. A reduction in seasonal variation might be expected if the effect of these factors could be analysed in detail and further selection carried out to eliminate those individuals which develop abnormally when subjected to the least favourable combination likely to be met with in the field.

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GOOD ESTATE MANAGEMENT

ELVEDEN

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IN the heart of the Eastern Counties, which are known as the "Granary of England", lies that vast tract of arid sand called the Breckland. It extends over 400 square miles from beyond Swaffham Bulbeck in the north to almost as far as Newmarket in the south. This feature, unique in the whole country, is a rich field for the rural historian, a veritable laboratory for the ecologist, but to the agriculturist, a challenge. The Elveden Estate comprises some 23,000 acres in the centre of the Breck, and the way in which Lord Iveagh, the present owner of the estate, is meeting that challenge, is likely to provide an inspiring chapter when the history of present-day British farming comes to be written.

In its natural condition the Breck was a dry, treeless heath or steppe. Unreclaimed areas in this condition may still be seen in sharp contrast to the cultivated or afforested land adjoining. By reason of the absence of trees, many of the very earliest settlements—those established before tree-felling tools were available—were located in this area. The settlement at Elveden, like many other early village centres, was based on a natural supply of surface water, although this has long since had to be replaced by deep borings into the underlying chalk.

Apart from this early settlement, little is known of the village or of the area in the vicinity of the present estate much before the eighteenth century. A number of brief references from chronicles of the time contribute, how-

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ever, to give a fairly clear and rather frightful picture of the Breck as it then was. There is no reason to assume that Elveden was in any way distinguishable from the desolate expanse of heath and blowing sand depicted, whose only contribution to the nation's food was rabbits and a very little rye; whose only habitation was the occasional hut of the warrener. Trees, and particularly Scots pine, although not locally indigenous, are very well suited to these conditions, and the very first stage in the general improvement was the planting of trees. Afforestation on the Breck provides a story in itself, and today the Forestry Commission alone have nearly 50,000 acres of woodland there.

Improvement and Reversion It was not until the agricultural boom of the late eighteenth century that the first major scheme of agricultural improvement at Elveden was undertaken. The Earl of Albemarle, the owner at that time, achieved remarkable results by emulating the methods by which his friend Coke had achieved such spectacular success in improving the sandy land of Holkham.

Albemarle, who took possession in 1786 of some 4,000 acres, was the first to create from the sandy wastes of Elveden what could reasonably be termed an agricultural estate. Like Coke, he achieved his results by the adoption of drill husbandry—the Norfolk rotation—by intensive stocking (particularly with sheep) and by heavy marling. It is interesting to note that he also grew small acreages of both sainfoin and lucerne, although he appears to have had more success with the former than with the latter. The agricultural work was preceded by extensive tree planting, both in belts and hedges. It is probable indeed that the hedges of dwarfed and distorted Scots pine, which still remain a striking and unique feature of the Breck, first appeared at Elveden at about this time. The sporting side of the estate was developed by Albemarle as successfully as the farming, and before he sold the estate in 1813 it was already notable for its shooting.

It was this feature that became its main attraction to subsequent owners, particularly throughout those years of agricultural depression when so many of the farming improvements were lost by reversion. It was this that probably attracted the trustees of one of its more colourful occupiers, His Highness the Maharajah Duleep Singh, who acquired the property in 1863. His Highness was a keen shot, and it is said that one of his ambitions was to kill 1,000 birds in a day with his own gun. It is on record that he got as near as 700 partridges. Apart from his grave in the village churchyard and the affectionate memory of the older workers, the hall itself provides a record of his thirty years at Elveden. He built a rather ornate structure around the modest manor house which had previously served the estate. This building still forms part of the existing hall.

The last decade of the Maharajah's life witnessed one of the worst depressions in the history of agriculture. An estate comprising so much land near the margin of cultivation must inevitably have suffered, even under the best management. His Highness was considered by his tenants to be a good landlord, but it is clear that beyond the maintenance of the shooting he displayed little interest or skill in the management of his estate. The position was aggravated by the fact that much of the land was still in hand and managed by bailiffs, and that during the last years of his life he took up permanent residence on the Continent. There is no detailed record of the condition of the estate at the time of his death, but there is every indication that there had been considerable deterioration: farms were derelict, arable land had reverted to heath grazing and buildings were neglected.

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A Famous Shoot The estate was then acquired by Edward Cecil Guinness, first Earl of Iveagh, the wealthy controller of the Irish Brewery of that name. Lord Iveagh bought Elveden as a country seat and, as might have been expected of a man of wealth and business ability, he succeeded in developing the property into a fine country estate. The mansion erected by Duleep Singh was extended to more than double its size, cottages were rebuilt and farm buildings brought into repair. The village church at Elveden was greatly enlarged. Several miles of new roads were constructed and the purchase of the adjoining parish and estate of Icklingham brought the size of the estate up to approximately its present size of about 23,000 acres. The golden days of the Edwardian era are still remembered at Elveden.

The shoot became acknowledged as possibly the best in the country. Edward VII and the then Duke of York (later George V), headed the list of distinguished names recurring often in the game records. Farming was, of course, a secondary consideration but, as a necessary ancillary to the preserve, it shared in the general improvement. More land was taken in hand and the general standard of husbandry was soundly based on the Norfolk rotation, including the maintenance of a Suffolk flock. The shoot always came first, however, and large areas were dedicated to game corn.

The estate responded to the demands of the First World War by expanding the area under cultivation, and much of the land previously left fallow for the gamekeeper was ploughed for corn. The expansion did not, however, last long, and when in 1927 the second Earl of Iveagh entered into the inheritance on the death of his father, British agriculture was again going through a period of extreme depression.

Since the Duke of Albemarle rescued it from the heath, the estate has been subject to constant change for better or for worse. The real story of Elveden lies, however, in the achievement of the last twenty-five years, and to appreciate that story it is important to obtain some picture of Lord Iveagh's inheritance and of the conditions prevailing.

Twenty-five Years of Development The 23,000 acres comprised the four parishes of Eriswell, Icklingham, Wangford and Elveden, each with its village centre. Some 6,500 acres were under cultivation, 3,000 acres were leased to the Forestry Commission, and a slightly greater area was under estate woodlands. Most of the remaining land consisted of unreclaimed heath. The system of husbandry was the standard four-course rotation with the roots folded by the Suffolk sheep. As a result of the prevailing low price of wheat and the inherently poor quality of the soil, rye was generally substituted for this crop. A good deal of sainfoin was grown, but very little lucerne. A certain amount of silage was made to supplement the short grazing season. Apart from the considerable flock of sheep, the only stock consisted of a few bullocks and a small dairy herd at each of the village centres. The main cash crops were barley and sheep products.

It is difficult to convey by mere figures just how different is the estate today and just how much the improvement achieved is independent of the general improvement of agricultural conditions. In 1954, a little over 9,500 acres were under crops, and this area is increasing by some 200-300 acres each year. In 1953, 353,000 gallons of T.T. milk were produced. Apart from the dairy herd, the estate also supports 1,100 beef cattle and 1,400 breeding ewes. Of 4,500 acres of corn, 2,000 are under barley, and a large proportion of that produced is of malting quality.

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The improvement in yields has been no less striking. During the ten years up to 1950 the average yield per acre of wheat over the whole estate increased from 6.4 cwt. to 14.8 cwt.; that of barley from 6.7 cwt. to 12.6 cwt., sugar beet from an average of 7 tons in 1940 to over 11½ tons per acre in 1950. From a Home Farm subordinate to the interests of a shooting estate, Elveden has become the largest mixed farm unit in the country and one of the most progressive enterprises of its kind.

The first factor in this story of success is the human one—the personality of the man who took over this vast responsibility when agriculture was at its lowest ebb, and whose knowledge, ability and sense of dedication has triumphed over the poverty of his land in depression, and over the handicap of large-scale military interference at a time when success might have been easiest. No less part of the human factor in this success is his partner, Lady Iveagh, who so truly shares the labours and triumphs of Elveden.

Lord Iveagh—The Man It is of particular interest to the agriculturist to see what personal qualities and experience a man conspicuously successful as a farmer has brought to this craft. The life of Lord Iveagh will, it is hoped, one day make an inspiring biography. His activities have been many and have covered a wide field. To them all he has brought great energy, the inquiring mind of a scientist and a determined sense of purpose. No modern farmer could ask for a better set of qualities.

In his youth, Rupert Guinness was a fine athlete, and the climax to a rowing career, started at Eton, was his winning of the Diamond Sculls two years running. He was never trained as a scientist, but early in his life he became deeply interested in medicine and, with his father, became a patron of medical research. He was a business man and had a long and successful career, both in local government and in the House of Commons. While resident in his East London constituency, he and his wife, Lady Gwendolen, took an active part in the administration of the Guinness Trust Fund, which had been established by the first Earl to improve housing conditions in the poorer areas of London and Dublin. The training scheme to fit emigrants for life in Canada was a particularly successful enterprise which was conceived by Rupert Guinness and organized by him and his wife.

In 1903 he took a 700-acre property at Pyrford in Surrey, but it was some years before he began to take a serious interest in the farming of the land. It was then that his experience in medical research led him to an interest in clean milk. The pioneering work in the production of T.T. milk from the Pyrford herd is well known.

This, then, was the background of the second Lord Iveagh, who, at a little over fifty years old, inherited the Elveden Estate.

His first steps were dictated by the prevailing agricultural depression. Arable cropping was confined to the better areas, and in 1934 the area under cultivation had been reduced to less than 5,000 acres. During the difficult conditions of the late 'twenties large farms up and down the country were seeking refuge wherever possible in extensive "stick-and-dog" farming. On the marginal land of Elveden there was, however, no profit in either beef or sheep. The whole of the subsequent success has depended on the fundamental decisions taken at that time.

The Problem When the present owner took over in 1927 the estate comprised, as now, some 23,000 acres which, except for the land in the immediate vicinity of the four village centres, was almost all on the

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arid, sandy soil of the Breck. Only two or three of the holdings were let and all the remainder of the agricultural land (then amounting to about 6,500 acres) was managed as a Home Farm. With the exception of a little over 6,000 acres of woodland, the rest of the estate was virgin heath.

It has been described how, at that time, the Norfolk four-course rotation, in association with Suffolk sheep, was the standard form of husbandry. In addition to the sheep, there were a few bullocks and small milking herds at each of the village centres. At the prices then ruling, this system was completely uneconomic on much of the poorer land, and it would have been an easy, even a normal, decision to let the marginal areas revert. Lord Iveagh's experience at Pyrford encouraged him to believe, however, that this was not necessary, but that the only economic way of providing the humus required was from a milking herd. This decision may seem so obvious in the light of conditions today that it is difficult to realize what an undertaking it must have seemed in the experience and conditions of those lean years.

From this first decision progress slowly followed. Early pioneering in the production of T.T. milk and the use of lucerne for grazing, first tried in 1934, were important landmarks, but the war brought serious checks. Large areas were taken by the Services for such disrupting purposes as tank training, billeting, and for an airfield. One result was the destruction of fifty miles of rabbit fencing, culminating in widespread damage to crops.

Space will not permit a stage-by-stage account of the agricultural and estate management developments of these years. It is, however, interesting to examine the way in which the main problems arising from this complex and expanding unit have been overcome : interesting because they have never been solved merely by spending large sums of money.

The basic problems to be faced in the task of improving and enlarging this vast unit can be grouped under the following heads :

1. The physical difficulty of reclaiming sandy heath never before cultivated and of building up humus.
2. A stocking policy adequate to deal with the produce from some 3,000 acres of leys and to cope with an increase of some 150-200 acres of forage crops a year.
3. The economic provision of buildings to house the steadily increasing herd, many of which were producing milk.
4. The maintenance of an adequate labour force.
5. The organization of this vast and complex unit comprising over 9,000 acres of agricultural land, an area which is increasing annually by the equivalent of a moderately-sized holding.

Reclamation Policy The initial restoration is perhaps the most spectacular step. The estate provides many striking examples of reasonable crops of corn and lucerne leys separated only by a rabbit fence from virgin heath. In its natural condition, the Breck comprises an acid sand overlying the chalk at varying depths. The heathland being reclaimed at Elveden includes heather, bracken and mossy areas. Large blocks, generally of 200-300 acres, are undertaken in one operation, since this allows the maximum advantage to be taken of heavy equipment. When the ground is extremely rough or covered with bushes, the first operation is with a bulldozer. Recent experience has shown that ploughing to a depth of 14 inches with a prairie buster buries heather as satisfactorily as it does bracken. The area is fenced against rabbits and the fence is closed just as ploughing



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Photo : Jack Elsten



Photos : Jack Elsten

Top: Lord and Lady Iveagh. Day-to-day management is a personal concern.

Centre: Every year 200-300 acres of heathland are reclaimed.

Bottom: Early summer cultivation for the first crop—usually rye.



Photos : Jack Elst

Top: Milk bails are used extensively.

Centre: Some of the 1,400 cross-bred ewes.

Bottom: Raw material for farm use.



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is completed. Rabbits which escape extermination therefore have no food and may be dealt with during subsequent cultivation. The initial ploughing is carried out during the early summer, when there is little other work for the crawler tractors.

The first crop is generally rye, although occasionally oats are substituted. The first yield is not considerable, but will often more than cover the cost of seeds and cultivations. A further one, or sometimes two, corn crops follow. Then, after a catch crop on which sheep are folded, the lucerne ley is established. The reclaimed land at this stage falls into the normal farm rotation, which is : lucerne (3-5 years) — wheat — barley — sugar beet — barley.

Although this rotation is followed over much of the unit, a greater variety of crops is grown on the better land near the villages. There are also some 500 acres of permanent grass.

Lucerne as a crop is so important that its management is of special interest. Although the crop is occasionally sown pure, the seed rate most frequently used is 18 lb. lucerne and 1 lb. cocksfoot (S. 143) per acre. Sometimes $\frac{1}{2}$ lb. of S.100 white clover is added. The leys are neither grazed nor cut during the year of sowing, but the cocksfoot is grazed early in the following winter after the lucerne has died down. Subsequently, the lucerne is mown or grazed down three times in the season. The successful grazing of lucerne is another important development at Elveden from which neither cattle nor the leys have suffered.

Stocking The rotation adopted results in a very large and ever-increasing acreage of leys, the greater part of which is lucerne. The present area of lucerne and temporary grass exceeds 3,000 acres, so the problem which inevitably follows is that of harvesting and conversion. Apart from the direct grazing of the leys, the lucerne is cut both for silage and hay (made on tripods), and two years ago a large grass drying plant was installed. In 1953, 450 tons of lucerne meal were produced in the drier, and some 300 tons were sold. This represents a relatively small proportion of the total cut, and no great reliance is placed on the future market for this product, so a very large quantity of lucerne and grass products must therefore be consumed on the farm.

The most profitable form of conversion is, as might be expected, to milk, and there are now five Guernsey and two Shorthorn herds, amounting to 500 dairy cows. The total dairy stock numbers 1,300, and, as previously stated, the annual milk production exceeds 350,000 gallons. A number of beef cattle have, of course, always been kept. Because of the limitations enforced by difficulties of labour and housing, there has been a recent tendency to increase the beef stock at a greater rate than the dairy herds, and there are now some 1,100 beef cattle of all ages.

The grazing programme is extremely complex. Winter-sown rye, top-dressed a month before, provides an early bite towards the end of March.

Poultry-Keeping in Cyprus (see article on page 428-31).

- Top :** In the past, poultry were frequently kept in badly lit, unventilated mud houses.
Centre : A new portable poultry house for 70 layers in use at a Government farm.
Bottom : The demand for day-old chicks is exceeding all expectations.

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This is followed by the cocksfoot leys, and, in April, by lucerne. Kale is fed up to January. Although in theory the arrangements appear simple, the acreages and the numbers involved make the task formidable. The cattle are supplemented by sheep, and a cross-bred flock of 1,400 ewes is carried.

Fixed Equipment The addition of new fixed equipment has for many years been one of the most difficult problems of the agricultural landowner. The provision of buildings at an economic cost for the production of clean milk has presented this problem in its most severe form at Elveden, where the number of milk cows has increased from a little over 100 before the war to the present figure of 500. At current building costs the task might have seemed to many to be insoluble, but the way in which it has been tackled is, particularly for land agents and owners, one of the most interesting aspects of the Elveden story.

Each of the village farms is provided with a conventional type cowshed with 20-30 ties, which have been brought up to modern standards. Largely because of the lightness of the soil and the low rainfall, it has been possible to make extensive use of the mobile bail for additional accommodation. During the summer the milk bails are taken out to the leys on which the cows are grazing. The bails are fitted with cooling units and the milk is cooled by a chilled water system. The water required, which is kept to a minimum by this method, is carried above ground from fixed points, so that any field which has a trough for grazing can be used for milking. The bails are also used throughout the winter, when they are brought in and placed on concrete standings laid down for this purpose in covered yards. A large number of these yards have been built with timber grown on the estate (much of it "in the round"), using estate labour.

The cost of this fixed equipment, which satisfies the requirements of the Milk and Dairies Regulations, is far lower per cow than the cost of constructing the conventional kind of cowhouse, or even of the purpose-built yard and parlour. It is, moreover, flexible and has the great advantage that the capital committed to milk production is kept to a minimum.

It is a rigid principle, particularly important on this light land, that the whole of the straw from the 4,000 acres of corn should be returned as manure. This entails some form of winter yarding for beef cattle also. Until recently the existing form of buildings has been supplemented by simple timber structures, but of late beef cattle have been wintered in yards enclosed solely by stacks of baled straw.

Overcoming Labour Difficulties East Anglia is one of the most sparsely populated lowland areas in the country, and, because of the distance from any town of appreciable size, the estate has had to rely largely on the villages for its labour force. Here again, the rapid expansion has set a formidable problem. This difficulty has been overcome mainly by three methods: increased mechanization; the importation of labour by building new houses and subdividing the larger old ones; and by absorbing on the farm, labour no longer required to maintain the sporting side of the estate. A certain amount of help is given by a small colony of European refugees.

It is in the field of mechanization that the size of the undertaking becomes an asset, and in this respect it goes far to offset the difficulties which arise from co-ordination. In 1933 there was not a single tractor on the estate; today there are 63. Many are crawler tractors of the heaviest type, and

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the greatest advantage can be made of this equipment, as the reclaimed land is flat and retained in large enclosures. The vast corn acreage is dealt with by 18 combines and 3 grain driers. The handling of the corn is as near to "push button" control as modern machinery can make it.

There are nearly 300 cottages on the estate, and some 26 more have been built since 1945. It is interesting to note that relatively few of these houses are "tied". The present labour force comprises 283, of whom 218 work on the farm. Twenty-seven work under the gamekeeper, although their main duty is dealing with the thousands of rabbits still caught annually.

The foreign labour pool is yet another unusual and interesting feature of the estate. There are 40 Ukrainians housed in part of the Hall, from which Lord and Lady Iveagh moved some years ago to a smaller house on the estate. This labour force makes relatively little contribution to the farm work, but is let out at contract rates to neighbouring farmers. They fill in time which would otherwise be idle by production work on the estate—mainly in the woodlands.

A Tremendous Organization There is, finally, the factor which is so often overlooked—that of the organization necessary to maintain so large a farm and estate under direct control. The farm is managed in three interdependent farm units, each with a bailiff in charge. All three are responsible to the farm manager, Mr. Harrison, who has been with the estate since 1933. The normal estate management questions, including management of the woodlands, are the responsibility of Mr. Dow, agent to the estate, who started with the first Lord Iveagh in 1920. These two men are of outstanding ability, and form, with Lord and Lady Iveagh, the team to which so much of the success is attributable. Lady Iveagh is particularly concerned with the livestock herd and has played a large part in guiding the stocking policy of the farm.

While Elveden is in so many ways unique, it is in others typical of the trend now common in the large agricultural estates. Agricultural prosperity, coupled with lagging rents and high taxes, has influenced many owners to take large tracts of land in hand. Many of these men with particular gifts of organization are forming the pattern of one type of large-scale farming in this country.

There are many morals which can be drawn from the story of Elveden, not least of which is that many of the marginal areas of England could be brought into cultivation economically, provided the scale of operation was sufficiently large. The one outstanding lesson to be learned is, I suggest, that contained in the Spanish proverb: "The heel of the master is the best manure for the land".

I should like to convey my thanks to Lord Iveagh for making available the facilities for the assembling of the material for this article; and to Mr. Dow, agent, and Mr. Harrison, farm manager, for their kind co-operation.

NATIONAL PIG RECORDS

The National Pig Records Scheme for England and Wales is getting away to a good start. Membership is already approaching the 1,000 mark, with 12,000 sows registered. If you are not already a member, your County Committee will tell you all you want to know about the scheme.

CRABBE OF ALDEBURGH

1754—1832

NIGEL HARVEY, M.A., Q.A.L.A.S.

George Crabbe was born exactly 200 years ago this month. Though in his time he was both doctor and parson, he is perhaps best known for his wealth of poetry, in which, with stark realism, he described the poverty and squalor of the agricultural scene in his native Suffolk before the era of the New Farming.

EAST Anglia has been more than fortunate in her literary sons, and down the centuries a long succession of writers, from Tusser via Bloomfield and Young to Haggard and Bell, has made Norfolk and Suffolk the most familiar of all farming areas. Among these writers, stands George Crabbe of Aldeburgh, parson, doctor and poet, who was born two hundred years ago this month. As a poet and as a man, he was good rather than great,



but he left on record a peculiarly observant picture of country life in Suffolk in the last generation of an older, simpler, tougher England which has now passed away. Between Crabbe and the modern reader stand the schools and the police, the railways and the newspapers, the piety and the prosperity of Victoria's reign, and though we can still visit the places he knew, we cannot enter the life he described. His poems belong to history as well to literature.

Crabbe came of that minor aristocracy—the independent, landless class below the gentry—who played so important and pervading a part in local life in the eighteenth century. His father was both schoolmaster and parish clerk at Aldeburgh, where his brother be-

came a collector of salt dues and, less officially, general factotum of the neighbourhood. He himself started his career as a doctor in his home town though he probably owed his medical knowledge more to his passion for natural history, and so for herbs, than to a medical apprenticeship which included errands and farm work as well as professional training. After a picturesque but unsuccessful attempt to seek his literary fortune in London, he abandoned medicine for the Church and spent the remainder of his life as a country parson. He was Rector of Trowbridge when he died in 1832. Most of his life, therefore, was secure and tranquil. Nevertheless, his epitaph speaks the truth, quoting Byron's description of him as "Nature's sternest poet, yet her best". Crabbe, who tended his neighbours in sickness and in sin, recorded the rural life of his times, especially that of his beloved Suffolk, even as Hogarth recorded its town life in another medium. Both were truthful, neither was pleasant.

The Realist Crabbe published much, despite "periodical incremations" of unsatisfactory manuscripts, but he owes his fame to certain lengthy poems on the life he knew at Aldeburgh, notably *The Village*, *The Parish Register*, and *The Borough*, which appeared between 1783 and 1809.

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None makes easy reading for the sentimentalist. Crabbe had little in common with either the Augustans who preceded him or the Romantics who followed him. He dealt in reality as he found it, and he began *The Village* with a repudiation of the pastoral futilities of his time wherein:

*... shepherds in smooth alternate verse
Their country's beauty or their nymphs rehearse.*

His purpose was to describe "the poor laborious natives . . . as Truth will paint them and the Bards will not". And the men of Crabbe's time still lived in a poverty and squalor that was almost medieval. The soil of the area was light, the crops wretched and devastated by weeds,

*... that every art and care defy,
Reign o'er the land and rob the blighted rye.
There thistles stretch their prickly arms afar
And to the ragged infant threaten war.
There poppies, nodding, mock the hope of toil ;
There the blue bugloss paints the sterile soil ;
Hardy and high, above the slender sheaf
The slimy mallow waves her sickly leaf ;
O'er the young shoots the charlock throws a shade,
And clasping tares cling round the sickly blade.*

The "burning sands of summer" and the "wide heaths . . . scented by the vapours of the sea-born gale" still dominated the landscape, for in the 1780s the New Farming, with its reclamations, four-course shift and cleaning root crops, still lay in the future. Townshend's example was as yet mere prophecy, and Coke no more than a young man, who had barely put his hand to the work which was later to make his estate a centre of agricultural pilgrimage. Only once, in a chance reference to patent ploughs, does the poet even mention the possibility of agricultural improvement. Crabbe saw the last age of the Old Farming, and it was significant that he needed his knowledge of botany to describe it.

Equally significant is his reference to rye, symbol of the agricultural poverty of the region. Indeed, "the bold, artful, savage, surly" natives won from the sea much of the living that the land failed to provide, sometimes by fishing, sometimes more lucratively by smuggling—a violent and corrupt trade to which extinction alone lent romance. Parson Woodforde could refer to "Andrews the smuggler" as casually as we refer to "Andrews the grocer", but Parson Crabbe knew better than Woodforde the cost at which the laws were evaded. At the Old Crown Inn at Aldeburgh, local opinion condemned as a traitor the member of a smuggling gang who in mercy cut down a hanging exciseman while the breath was still in him.

Crabbe dealt early and effectively with that comforting but dangerous half-truth, the robust health of the countryman, which is supposed to compensate for so much. He pictures the labourers endlessly toiling in heat and cold, "hoarding up aches and anguish" for their old age from constant exposure to "alternate suns and showers", and living on a diet which was

*Homely, not wholesome, plain, not plenteous, such
As ye who praise would never deign to touch.*

Indeed, it is difficult for the modern Englishman to imagine the physical strain on the countryman before the days of agricultural machinery, when every crop was sown, reaped, and threshed by hand and there were no bicycles to save the weary trudge from cottage to work. Further, the fieldsmen whom Crabbe knew were seldom the independent peasantry who figure so prominently in the golden legend of our rural past. They were labourers working

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for hire on someone else's land, and into the mouth of one of them the poet put the couplet :

*These fruitful fields, these numerous flocks I see,
Are other's gain, but killing cares to me.*

And in the background, an enduring threat to old age, stood the poorhouse—a filthy, neglected building where dwelt in unseparated chaos the aged, the infirm, the widows, the parish children and

*The lame, the blind, and far the happiest they,
The moping idiot and the madman gay.*

Rural Distress All this was painfully typical of the time : but worse was to come in the distress and poverty of the Napoleonic Wars. Not until 1834 was the Poor Law reformed, and even then it was a long time before the reign of incompetence and casual cruelty was finally ended. The recasting of local government was one of the greatest of all the Victorian achievements. Nowhere was it more needed than in the administration of the Poor Law.

Hence the peculiar delight which the labourer took in his cottage garden :

*It is his own he sees ; his master's eye
Peers not about some secret fault to spy,
Nor voice severe is there, nor censure known
Hope, profit, pleasure, they are all his own.*

The poet mentions chives, leeks, beans and herbs among vegetables commonly grown, and also writes of "ponderous roots in soil below". Presumably this was a reference to potatoes, which at that time were still a recent addition to English crops. The countryfolk of the later eighteenth century had little use for this plant, which they regarded as at best a nuisance, at worst a danger ; there could be little good, they held, in a root which was ignored by scripture and eaten by Irishmen. It took many years before even Coke persuaded a few daring souls to admit that "perhaps tha' wouldn't poison tha' pigs", and an agriculturally-minded Suffolk parson of Crabbe's time lamented pleasantly that his parishioners heeded his exhortations to grow potatoes no more than if he had preached them from the pulpit. Not till the early 1800s, in the hungry days of the French wars, did the potato become a normal item of English diet.

Even without the potato, however, the importance of the cottage garden was great. Indeed, it offered one of the few innocent opportunities for recreation open to the villager at that time. Crabbe refers occasionally to such sports as cricket and quoits, more frequently to cock fighting, poaching and drinking at the inn kept by a blind, fat landlord,

*Big as his butt and for the selfsame use,
To take in stores of strong, fermenting juice,*

whose house was as unattractive as its owner :

*The heavy ale in spots like varnish shows
Where chalky tallies yet remain in rows ;
Black pipes and broken jugs the seats defile,
The walls and windows, rhymes and reck'nings vile ;
Prints of the meanest kind disgrace the door
And cards, in curses torn, lie fragments on the floor.*

It was frankly a drinking shop, the crude ancestor of the pleasant country pub of today. We must remember, incidentally, that the sobriety of England is a relatively modern development. In Crabbe's day the "gin-mania" of the 1740s was still a grim memory and the pay-day broil in the noisy inn was a common incident of the rural life. It is perhaps apposite to recall that the

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present writer's great-grandfather, a contemporary of Crabbe, was one of the first Englishmen to make a fortune by importing tea.

The Passing of Witchcraft . . . At first sight, the village and its manner of life in the eighteenth century had altered little since Tudor times. Tusser would have found little strange in Crabbe's Suffolk. Nevertheless, change was coming to the minds of men even if, as yet, it had hardly affected their physical environment. In particular, witchcraft had by this time lost its evil power even in East Anglia, where, in the words of Forby, Rector of Fincham in Norfolk in the 1820s, "the soil appears to have been unusually favourable to the production of witches". This was not so much because the people of this area were specially addicted to the Black Arts, but because in this stronghold of Puritanism witches were held in special horror and pursued with ruthless fanaticism. Such old memories died hard. A man was "swum" for wizardry in Suffolk as late as 1825, and the last known case of attempted lynching for this crime occurred over the border, in Essex, in 1863.

These, however, were extreme survivals. The Wise Woman of Crabbe's village, "who knows all secrets or affects to know", was a harmless if squalid figure,

*Mistress of worthless arts, depraved in will,
Her care unblessed and unrepaid her skill,
Slave to the tribe to whose command she stoops
And poorer than the poorest maid she dupes.*

She was not, incidentally, the last of her race. The present writer has met an elderly farm bailiff, living not very far from Aldeburgh, who, when a young man, had consulted one of these local oracles about a missing watch. But when the agents of the supernatural stoop to the work of a Lost Property Office, it is clear that the end of the tradition they represent is at hand. We may, in sentiment, regret this change, and we have unquestionably lost something of our past—something ancient beyond understanding, something which survived the Conversion, the persecutions, and the Enlightenment, something which can never be replaced. But in truth it is a great deliverance to mankind that beliefs which not so very long ago sent honest men to hang, burn and torture should now be no more than interesting raw material for the anthropologist's files.

. . . and the Coming of Literacy The failing powers of superstition provided perhaps the most obvious instance of the slow workings of a new power—education—which was ultimately to transform the life of the nation. Long before Brougham cried in triumph that "the schoolmaster is abroad", long before the National Schools, the influence of this new force was making itself felt. Crabbe noted that the entries in the marriage register were signed with names, even if ill-written names, and not marked with crosses, while the cottage of an "industrious swain" might contain a small library—the Bible, the equally inevitable Bunyan, and chap-books of such old stories as Tom Thumb, Hickathrift and the Wandering Jew. This literacy was perhaps the greatest single difference between the village on the eve of the New Farming and the village of Tudor or Stuart times.

Few poets have enjoyed better opportunities of studying their fellow villagers than Crabbe, who ministered to both their bodies and their souls. Few have made better use of such opportunities, and in him Old England found one of its best, as well as one of its last, voices.

THE CATTLE OF BRITAIN

18. SOUTH DEVON

IN the past, there has been much conjecture as to the origin of the South Devon breed, but such speculation can be little more than guesswork. What is known with certainty is that they have existed in the very limited area of South Devon and Cornwall, more or less in their present form, for many generations. This geographical limitation of the breed has often led to the assumption that South Devons will not thrive outside their native counties. In fact, nothing is farther from the truth. At the four main store sales held in South Devon each year some 5,000 head are sold for "export" to the fattening pastures of the Midlands, to the Eastern Counties and even to Scotland, and the same buyers return year after year for stock. The post-war years have also seen the establishment of several breeding herds outside the South-West.

The South Devon Herd Book Society was formed in 1891, and the first volume of the Herd Book, published in that year, shows a membership of 130 and the registration of 143 bulls and 972 heifers. The Society gradually grew until, at the outbreak of the Second World War, membership was in the region of 450. But the great expansion of the Society was yet to come. At the beginning of 1948, largely due to the untiring efforts of the then Secretary of the Society, and to the co-operation and foresight of one of the principal buyers of milk in the South-West, South Devons were recognized by the Ministry of Food as a premium milk breed, and the special designation "South Devon Milk" was granted. The extra 4d. per gallon for milk had an immediate effect: membership of the Society doubled within the space of two or three years and an unprecedented demand for good stock arose. Today, membership of the Society stands at well over 900, and about 5,000 animals are registered annually in the Herd Book proper and in the two supplementary registers.

The South Devon has always been recognized as being the largest British breed, and this still remains true, although the present-day South Devon is only slightly heavier than the Friesian. This size, together with the large weight to which the steer may be carried, has made the South Devon a very popular breed during, and immediately after, a period of war. It has also saddled the breed with the stigma, and consequent penalty, of "heavyweight beef" in the later periods when the temporary demand for quantity has passed. The fact that the South Devon can produce quantity (combined, let it be said, with quality) has tended to obscure the fact that the breed is equally capable of producing early-maturing beef within the now more popular weight ranges.

It was fortunate for the South Devon breed that during the last war the demand for milk was as insistent as the demand for beef. As a result, not only were the milking qualities of the breed developed, but it was possible to avoid that curse of dual-purpose breeds—a breeding policy alternating between beef and milk. Policy since the war has been aimed at the maintenance and development of both sides of the breed—with a definite tendency toward a rather neater animal—while at the same time insisting at all costs on maintaining high butter fats.

It is perhaps not out of place to point out that the South Devon is the only breed which qualifies for a premium on its milk, as well as for the official subsidy on both its heifer and steer calves.

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Before the war, South Devon milk was famous principally as the source of Devonshire cream, and although herd averages in the neighbourhood of 900-1,000 gallons were not unknown, the breed's milking propensities were not highly regarded. The demand for milk during and after the war changed all this. Although, to safeguard the essentially dual-purpose features of the breed, the official breed standards for a 305-day lactation remain at 600, 700 and 800 gallons for first-calvers, second-calvers and cows, respectively, herd averages of 1,000 gallons or more are now common, while individual performances of 2,000 gallons and over are no longer a rarity. Two outstanding recent performances are a 365-day lactation of 23,060½ lb. at 5.21 per cent butter fat and a 24-hour yield of 113½ lb. at 4.3 per cent butter fat. Although these high yields are a comparatively recent development, it should not be forgotten that the Supreme Champion at the London Dairy Show in 1929 and 1930 was a South Devon cow, "Milkmaid 14th", who still holds the world record (4 lb. 10½ oz.) for weight of butter produced from a 24-hour yield of milk.

The merits of the breed as producers of beef have long been known in its native counties and in the Midlands. These merits appear to depend largely on the capacity of South Devons to thrive on roughage, on their ability to put beef on to a frame which continues to grow at the same time, and on the fact that whatever size the animal may grow to, the final product is never excessively fat or wasteful. The practice adopted at the last three Smithfield shows of selling the exhibits by auction has had the effect of bringing South Devon beef to the notice of buyers in all parts of the country, and of inspiring many tributes to its quality.

Apart from the breed's more obvious attributes (milk, beef and butterfat), there is one other that deserves special mention—longevity. The South Devon wears well. The cows will continue to breed regularly, while producing good yields over many lactations. There is an outstanding example of three cows, half-sisters by the same bull, two of them aged nineteen and one eighteen, which have in their lifetime produced forty-six calves between them and have averaged 751 gallons of milk per lactation. Many South Devon bulls between twelve and fifteen years old are still working, in some cases in their fourth herd.

Overseas, the principal demand for South Devons has come from South Africa, where the flourishing South Devon Breeders' Society of South Africa looks after the breed's interests. The demand is mainly for bulls for the pedigree herds supplying bulls for crossing with the native cattle. Since the war, exports have also been made to Spain, Brazil and the West Indies.

To sum up, it may be fairly said that the outstanding characteristic of the modern South Devon is its undoubted ability to meet whatever demand is made upon it. If milk is the primary consideration, the South Devon will give it in quantity and quality : if meat is wanted, the answer is the same. No one could ask for more.

*W. G. Turplitt,
Secretary,
South Devon Herd Book Society*

19. SUSSEX

AS a rule, the practical agriculturist is but little interested in the history of a breed : its condition at the moment is a matter of far greater importance to him. It is not proposed, therefore, to delve any deeper into the origin of Sussex cattle than to say that they are descended from the red cattle with medium-sized horns which were known in the southern and south-western counties of England many years ago. Some writers have suggested that the ancestors of Sussex cattle were among the indigenous breeds found in Britain at the time of the Roman Conquest.

The question which was the best breed of beef cattle before the Second World War was often answered according to a man's prejudice. When feedingstuffs were cheap it did not greatly matter which a farmer chose : if his soil was tolerably good and his grazing land fairly extensive, he could not go wrong if he selected any one of the recognized beef breeds of Britain. But the post-war economy and the high prices of concentrated feedingstuffs have imposed a handicap upon the beef-producing farmer which makes it necessary nowadays to choose far more carefully to get the animal which will yield the greatest amount of meat in return for a minimum of food. Today, when the replenishing of the stockyards of the world is attracting much attention, it is important that breeders and farmers should consider the aptitude of the different British breeds to their particular purpose. Those who are anxious to discover the most economical meat-making animal, and the one which will therefore yield the largest margin of profit, cannot afford to overlook the advantages of the Sussex.

In the modern development of the Sussex, the aim has continually been to produce symmetry with the minimum of waste. Breeders have striven persistently along the lines of selecting breeding animals from those with the finest quality of bone and the maximum of flesh. In the choice of those possessing the last-mentioned quality, they have discovered that the deep cherry-red colour of the animals is always indicative of good flesh and the best fattening tendencies. In the direction of early maturity, too, efforts have met with great success, so that today it can be claimed for the Sussex that it is second to none in early production of the finest quality "marbled" beef. On poor land, there are no more excellent grazers than the Sussex, for they keep themselves in good condition on the coarsest and most scanty herbage. It should also be said that while Sussex cattle thrive under hard conditions, they also give a handsome return for good feeding. No climatic test has ever found the Sussex wanting : it can stand extremes of heat and cold. It is also practically immune from tuberculosis : today, over 90 per cent of Sussex herds are attested—a distinction probably enjoyed by very few other breeds.

Not only is the hardiness of the pure-bred animal unsurpassed, but no other type of animal has the ability to thrive and to reach beef weights on second-class pastures as have the Sussex crosses. Cross-breeding plays a very large part in the cattle industry of Great Britain, and successes in the carcass competition at Smithfield testify to the real worth of the Sussex for crossing, as well as for pure breeding. Comparative figures taken over a number of years show the Sussex to be unexcelled in weight for age when the quantity of feedingstuffs consumed is taken into account. The offal is light, and maturity is quickly reached when a Sussex is crossed with either

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a Dairy Shorthorn or a British Friesian cow. The dressed carcass from this breeding has the great hindquarters, ribs and loin associated with the pure breed. The distribution of fat and marbling of the lean meat is attractive to both butcher and consumer alike.

In prolonged drought and shortage of keep, this breed excels in its capacity to keep its bloom and condition. Sussex live to great ages, too. Many bulls of from 8 to 12 years are still in full use. They are easily managed and, if desired, can run with the herd.

The advancement made by Sussex cattle over the past years, particularly in the matter of attestation, is fully reviewed in the Breed Society's publications. With national and county shows restricting entries to attested cattle only, Sussex breeders have every opportunity of bringing before the beef-producing community the merits of the cattle. A sure sign of progress is also seen in the number of registrations for the annual volume of the Herd Book, which during the past years has more than doubled. Most of the Sussex herds are, of course, found in the south-eastern counties, with a few in Hampshire, but a number of farmers in Yorkshire and Scotland have also decided that Sussex cattle are worthy of adoption under their conditions.

In continuation of their progressive policy, Sussex breeders have given due consideration to the increasing demand for polled breeds of beef cattle throughout the beef-raising countries of the world. So that the Sussex may continue to compete with other beef breeds abroad (and incidentally with polled cattle at home), an experiment to produce a sub-race of Polled Sussex has been undertaken, and is meeting with much success. It is anticipated that it will take from 12 to 15 years to produce a pure-bred polled Sussex, but the scheme has been in operation since 1951.

Sussex cattle have for many years been exported to South Africa, where they are very popular and cross well with the Afrikaner. They have established themselves now in Texas, where they have been on trial for the past four years, and several consignments have been shipped to that State. Florida has also entered the market, and here again the breed has given every satisfaction. Farmers in Kenya, too, have been quick to realize the virtues of the breed. With the establishment of the Polled Sussex in the near future, the Sussex breeder should be well equipped to continue supplying the ideal animal, both for the home market and for the other beef-producing countries of the world.

*A. G. Holland,
Secretary,
Sussex Herd Book Society*

Seventh International Grassland Congress

The Seventh International Grassland Congress is to be held at Massey Agricultural College, Palmerston North, New Zealand, during the second week of November, 1956. It will last for one week and will be followed by post-conference tours in both the North and South Islands.

Because the Congress is being held in New Zealand, the programme has been deliberately given a bias towards New Zealand grassland farming, but many of the sessions will be dealing with subjects of a general nature, and an endeavour is being made to secure papers from leading grassland research workers throughout the world.

Inquiries regarding the Congress should be addressed to the Organizing Secretary, Seventh International Grassland Congress, P.O. Box 2298, Wellington, New Zealand.

GOAT'S MILK FOR LONDONERS

A NINETEENTH CENTURY ENTERPRISE

G. E. FUSSELL, F.R.HIST.S.

IF a foreigner in his national costume were to try to drive a flock of goats from Leicester Square along to Long Acre today, he would encounter a lot of traffic troubles. He might even arouse a little interest amongst the passers-by, although Londoners are inured to strange sights. Even if he succeeded in making the trip, however, I doubt if he would sell any goat's milk on the way. But this is what a Frenchman did a hundred years ago. He cannot have known it, but he was in line with the cow-keeper who had done a thriving trade in St. James's Park in the eighteenth century, selling milk fresh from the cow to the children who were taken into the Park for an "airing".

The Frenchman was not content to take up his stand and sell his milk to passers-by. He was more enterprising. He drove a flock of six goats every day through the squalid back streets which then stood between Leicester Square and Lincoln's Inn Fields. Sauntering along behind his docile herd that knew the road as well as he did, he roused the customer by playing a tune on a pipe, supposed to be of the pattern of Pan's pipes. It was a pleasing, almost poetic, substitute for the melancholy howl of the more conventional milkman. At his order, the goats would stop at the customer's door and a pennyworth of milk would be drawn off into a tiny measure, nearly a score of which would barely have filled a quart jug. While one goat was being milked, the others stood by nibbling at any stray vegetable refuse, cabbage leaves and so on, that littered the roadway. They were great pets of the local children, who fed them with crusts from the family table.

Few areas of London could then have been more remote from anything slightly resembling the countryside, and this little procession in the heart of London strikes a strangely Arcadian note. But probably few Londoners of that time knew about it. On the other hand, there were a good many sellers of asses' milk, which was supposed, perhaps rightly, to have some peculiar healthful virtue. But few people would be inclined to drink it today.

Although the Frenchman's tiny enterprise may not have been known to many Londoners other than those on his "walk", its fame certainly reached overseas. Perhaps he unwisely wrote home to tell of his success. He got a good price for his product, though he collected it mostly in pennies. His measures were so small that he got about eighteenpence for a quart of milk. And since each goat yielded about two quarts, he made three shillings daily from each goat. With total takings about eighteen shillings a day, he was a wealthy man, compared with what he might have earned on a minute farm in his native country.

When they heard about it, three of his fellow countrymen from their farms at the foot of the Pyrenees decided to try their fortunes too. They were not very wise, nor very scrupulous, men. All the rest of London was open to them, yet they could only see that the first man was prospering in the district of his own "walk". They tried to compete with him there and, of course, over-supplied the market. A desperate competitive struggle ensued, but

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happily the first-comer was able to maintain his prestige and keep his customers. His countrymen were forced to return to their homes, sadder and wiser men.

A London Goat Farm His success, modest though it was, must have become known elsewhere, too, for it stimulated an enterprising Englishman to undertake the production of goat's milk for the London market on a fairly large scale. He rented a hundred acres from Lord Lovelace in the neighbourhood of Ranmore Common, one of the best known and prettiest spots in Surrey. This was an almost unique undertaking, for there was no other goat farm within reach of London. The Ranmore farm was partly arable and partly pasture, and like many such novel experiments, it was probably over-capitalized. A large and airy goatshed was built for winter housing of the flock that was kept out at grass in the summer. As a beginning, no less than 107 milch goats were acquired, with two others for stud.

Most of these animals were brought from Ireland, but some were obtained from the seaside proprietors of goat carriages—perhaps the only place where the animals were seen by most people. The milch goats were of no great standard, and the owner expected that the flock would have to be rigorously weeded before it could become a commercial success. The stud goats were of better quality. One was an old veteran, exceedingly fierce and a terror to his keeper. The other, a fine young Abyssinian goat with noble horns, had yet to learn the secret of his own strength.

The work was arduous. Milking was done twice a day by a man, but in the spring they had to be milked three times a day. Goats are awkward to milk, and will not yield to a stranger. Often, when they are eventually reconciled to a new milker, they are found to have gone off for want of stripping. It is always a tedious and time-consuming job.

Yields at Ranmore were not very high. Three pints a day was the average—rather less than that given by the Frenchman's animals—but the project was felt to be promising. All the milk produced—about 200 quarts a day—was readily sold at between 1s. 6d. and 2s. a quart, and it was thought that a production of 200 gallons a day would be equally readily disposed of. The farmer intended to increase his herd until the farm was carrying 2½ goats an acre, and no doubt he intended, too, to select his stock more carefully as time went on, in order to secure a higher yield.

With the unbounded optimism with which our Victorian ancestors regarded all novel enterprise, they thought it probable that this goat farm near Dorking, and the Pyrenees goatherd with his Pan pipes, might prove to be the pioneers of a great and flourishing industry. What happened to the goat farm at Ranmore I do not know: it vanished into the limbo where so often unusual farming disappears, and I imagine the Pan pipes of the French goatherd became silent, too, when time overtook their owner.

It is regretted that the Agricultural Index Numbers and Prices for the third quarter of 1953-54 are not yet available. Publication of the article on Fowl Pest, announced last month, has also had to be postponed.

AGRICULTURAL MACHINERY CENSUS, 1954

ENGLAND AND WALES

Estimated numbers of certain machines and implements owned by occupiers of agricultural holdings, agricultural contractors and County Agricultural Executive Committees, with comparative figures for the 1952 Census.

MACHINE OR IMPLEMENT	JANUARY 1952	JANUARY 1954
TRACTORS AND PLOUGHS		
Tractors :		
Tracklayers : 10 h.p. and over burning		
P.V.O.	15,610	9,800 2,460 8,330
Petrol		
Diesel		
Wheeled : 10 h.p. and over burning		
P.V.O.	267,390	248,940 26,520 38,340
Petrol		
Diesel		
Total agricultural tractors	283,000	334,390
Tracklayers : under 10 h.p.	4,060	3,650
Wheeled : under 10 h.p. (including 1- and 2-wheeled and self-propelled implements and motor hoes)	37,900	54,680
Total horticultural tractors	41,960	58,330
Mould-board ploughs :		
Horse	120,120	94,870
Tractor :		
1 furrow	46,080	41,320
2 or 3 furrow	221,550	233,520
4 furrow and over	9,490	10,120
Cultivators, grubbers or scufflers (not including hoes or harrows) :		
Horse	81,470	69,760
Tractor	148,220	167,540
Rollers	207,420	196,630
SOWING AND FERTILIZER DISTRIBUTING		
Corn drills	89,490	88,560
Combined seed and fertilizer drills	28,620	33,430
Root drills	86,860	84,500
Farmyard manure spreaders	(a)	38,460
Fertilizer distributors over 5 feet wide	96,120	102,450
Potato planters	16,900	20,260
Seedling transplanters	5,810	6,520
HARVESTING		
Mowers : over 3 feet wide :		
Horse	86,820	62,050
Tractor	133,060	152,800
Side rakes and swath turners	138,630	147,410
Hay tedders	45,670	45,040
Hay rakes (not hand rakes)	175,590	164,960
Hay sweeps	98,320	96,110
Silage sweeps and buck-rakes	(a)	19,020
Hay loaders	31,630	31,390
Hay, corn and straw elevators	60,790	61,380
Binders	117,380	114,270
Combine harvester-threshers	16,470	21,120
Greencrop cutter-collectors	1,550	1,150
Greencrop loaders	9,290	10,750
Silage cutters and blowers	1,610	1,420
Potato spinners	61,990	62,790
Potato elevator diggers and shaker diggers	8,780	9,060
Complete potato harvesters	830	940
Sugar beet ploughs, lifters and lifting attachments	29,580	28,960
Sugar beet topplers	2,500	2,710
Sugar beet lifter-cleaners	3,070	3,500
Complete sugar beet harvesters (combined topper, lifter and cleaner)	1,450	2,060

(a) Not collected.

AGRICULTURAL MACHINERY CENSUS, 1954

MACHINE OR IMPLEMENT	JANUARY 1952	JANUARY 1954
BARN AND FARMYARD		
Portable threshing machines with drum width 2 feet 3 inches or over	14,040	13,320
Fixed barn threshers	(a)	4,600
Hay and straw balers :		
Stationary	8,310	8,640
Pick up	11,430	19,990
Loaders (other than hay) :		
Tractor-mounted :		
Fork type	7,000	12,130
Jib type	770	1,130
General purpose : elevator type	3,430	4,610
Potato sorters :		
Hand (not riddles)	21,900	18,450
Power	14,800	15,980
Grinding mills : power operated	81,880	79,900
Hammer mills :		
5 h.p. and under	6,540	9,100
Over 5 h.p.	16,220	18,420
Grass driers	1,070	1,250
Grain driers :		
Continuous grain flow	1,400	1,480
Tray		260
Platform (in sack)	480	830
Ventilated silo, bin or floor-forced air flow (number of installations)	520(b)	970
Winnowers and cleaners : power operated	8,480	8,830
Shearing and clipping machines	48,810	48,910
DAIRYING		
Milking machines :		
Bucket :		
1 and 2 units	33,230	38,810
3 units	26,960	30,200
4 and more units	14,750	15,220
Releaser or recorder :		
1, 2 and 3 units	3,450	3,790
4 and more units	2,360	2,720
Total milking machines	80,750	90,740
Sterilizing installations :		
Electric	15,810	17,870
Other	33,310	30,280
Milk coolers :		
Mechanically refrigerated	6,400	7,500
Non-mechanically refrigerated	92,150	100,630
TRANSPORT, POWER, ETC.		
Stationary petrol and oil engines :		
2 h.p. and under	128,860	120,770
Over 2 h.p. but not exceeding 6 h.p.	78,300	65,750
Over 6 h.p.	14,650	12,700
Total Petrol and Oil Engines	221,810	199,220
Electric motors :		
2 h.p. and under	68,770	88,730
Over 2 h.p. but not exceeding 6 h.p.	25,660	30,990
Over 6 h.p.	12,360	14,190
Total Electric Motors	106,790	133,910
Waggons and carts	340,610	269,350
Electric fencing units	(a)	89,590
Motor lorries and motor vans :		
Under 2 tons	55,900	52,770
2 tons and over	33,400	30,560
Tractor trailers	263,100	299,000
Spraying machinery :		
Power fruit sprayers	8,010	8,280
Wheeled and tractor-mounted ground crop sprayers	9,330	18,260

(a) Not collected.

(b) Revised figure.

THE MINISTRY'S PUBLICATIONS

Since the date of the list printed in the October 1954 issue of *AGRICULTURE* (p. 358), the undermentioned publications have been issued.

MAJOR PUBLICATIONS *Copies are obtainable at the prices quoted from the Sale Offices of H.M. Stationery Office or through any bookseller.*

Bulletins

- No. 21 Domestic Preservation of Fruit and Vegetables (*Revised*) 3s. 6d. (3s. 8d. by post)
No. 38 Sex Linkage in Poultry Breeding (*Revised*) 3s. 0d. (3s. 1½d. by post)
No. 48 Rations for Livestock (*Revised*) 4s. 6d. (4s. 9d. by post)
No. 92 Chrysanthemums (*Revised*) 3s. 6d. (3s. 8d. by post)

Technical Bulletins

- No. 3 Brown Rot Diseases of Fruit Trees (*New*) 5s. 0d. (5s. 3d. by post)

Other Publications

Costs and Efficiency of Pig Production : A Comparison between England and Denmark (*New*) (2s. 1½d. by post).

LEAFLETS *Up to six single copies of Advisory Leaflets may be obtained free on application to the Ministry (Publications), Chester Terrace, Regent's Park, London, N.W.1. Copies beyond this limit must be purchased from the Sale Offices of H.M. Stationery Office.*

Advisory Leaflets

- No. 13 Apple Sawfly (*Revised*)
No. 54 Black Bean Aphid (*Revised*)
No. 94 Maize for Fodder and Silage (*Reissued*)
No. 375 Cloche Cultivation (*Revised*)
No. 393 Feeding for Winter Milk (*New*)
No. 425 The Packing of Apples in Returnable Bushel Boxes (*New*)
No. 428 Trussing of Poultry (*New*)

Fixed Equipment of the Farm Leaflets

- No. 24 Bulk Storage of Potatoes in Buildings (*New*) 1s. 0d. (1s. 1½d. by post)

FREE ISSUES *Obtainable only from the Ministry (Publications), Chester Terrace, Regent's Park, London, N.W.1.*

Farm Machinery Leaflets

- No. 15 Farmyard Manure Handling (*New*)

R.A.S.E. Research Medal

The Royal Agricultural Society of England have decided to offer annually a medal, together with an award of one hundred guineas, for research work of outstanding merit carried out in the United Kingdom, which has proved, or is likely to prove, of benefit to agriculture. The award will be known as the R.A.S.E. Research Medal.

Heads of University departments, research stations and institutes and other research establishments are invited to submit to the Secretary, Royal Agricultural Society of England, 16 Bedford Square, London, W.C.1., in January of each year, the name of any member of their staff they may wish to recommend as a candidate for the award. Recommendations must be accompanied by a brief statement of the candidate's attainments and a list of his publications. No direct applications by candidates will be considered.

The award will be considered annually, but only granted in the event of a candidate being put forward with a record of work of outstanding merit.

FARMING AFFAIRS

The Farmer in a Free Market The Rt. Hon. D. Heathcoat Amory, Minister of Agriculture and Fisheries and Food, spoke to members of the Farmers' Club on November 1 about the prospects for the individual farmer as he saw them. He emphasized the changed economic circumstances operating today, within which farmers must work—a free market, with its interplay of supply and demand (and that meant renewed attention to quality). But this was coupled with a system of price guarantees and supports for each of the major commodities designed to protect farmers against unremunerative prices and to provide the stability needed for continuing full production.

The days of precise commodity targets were gone, although the Government could from time to time give some general indication of what would seem to be desirable trends in the level of production of particular crops or types of livestock.

"In the free conditions of today," said the Minister, "it is entirely within the discretion of each individual farmer what he produces on his own holding so long as he conforms with the rules of good husbandry. He knows better than anyone else the circumstances of his case; he knows the peculiar qualities of his soil; he knows, I hope, what are his production costs and how they can best be trimmed; he sees how the markets have been moving and forms a view of their likely future trend, taking account of the general guidance given him by the Government through the price and market guarantee system. He has to take all these factors into account and make up his own mind what adjustments to make in his production policy and plans, what will best suit his farm—and his pocket. He may decide that the balance between crops and livestock should be altered; that he must grow more of this crop or that, in order to take fuller advantage of special equipment and so bring down his costs. Whatever the decisions may be, they will be his alone and they will reflect his skill and judgment in the business of farming. This surely is the best way to make the best use of our land, to ensure the best livelihoods to those engaged in the industry and the best value to the consumer."

And what was the Government's role in these new circumstances? "The object of our policy," said the Minister, "is a strong, prosperous and stable agriculture, because we are convinced that that is vital to the interests of the whole nation—producers and consumers alike. That object is as important today as ever, and in our opinion will remain so. So that is our permanent basic aim."

To attain it, Mr. Heathcoat Amory said that the emphasis must be increasingly on efficiency—that is, improvement in quality and reduction in unit cost. "We want further expansion, but it must be an expansion of the right kind and quality. We must concentrate particularly on those products in which we are relatively most efficient, and those which the consumer wants. We have estimated that we ought to be able to achieve a net output on these lines within the next few years of about 60 per cent above the pre-war level. We must continue to make our best efforts to reach that level, but while keeping that general output objective in front of us, we must keep our production as flexible as possible.

"At present we need more beef; and more mutton if costs can be brought down: at least as many pigs as we have, provided that we can continue steadily to improve their average quality, both for pork and bacon, and bring down costs substantially. Milk production at present is rather higher than

FARMING AFFAIRS

the demand for liquid milk would justify, but if this demand can be sufficiently expanded (as I hope it can) then we shall be glad to see a further increase there too. On eggs, we have said that maintenance of expansion of output must depend upon a firmer market or a reduction in average costs. There is scope for further increases in the production of feed, especially from higher quality grass."

The Minister re-emphasized that the Government's policy is anchored in the Agriculture Act, 1947, and that it means to ensure fair prices for efficient production. "While we cannot insulate the industry from all the effects of changing market requirements, I can assure you that as regards Government policies there will be no sudden reversals or sharp changes," he said.

Mr. Heathcoat Amory went on to speak of the partnership existing between the industry and the Government. There were five partners as he saw it—the farmers, the farm workers, the landowners, the ancillary industries and the State. All had their several and important parts to play in the furtherance of the efficiency of the industry which they had jointly helped to build up.

"I want to end," concluded the Minister, "on a note of sober but robust confidence in the future. We cannot tell what lies ahead in this rapidly moving world. But judging from the record of progress and increasing efficiency recorded over the past fifteen years, British agriculture is going to give a good account of itself. Never has our land been so well or so productively farmed. There is clearly immense scope ahead for future progress. Together—as partners—we must exploit with the greatest energy our assets, our skill and our opportunities, for they are all considerable.

"I can assure you that Her Majesty's Government mean to continue to play our part in our proper field with steadfastness and vigour, and will do our utmost to ensure continuing stability and prosperity to our greatest national industry. I can only say I am proud to have the chance of serving in my present capacities and only wish I could bring more knowledge and experience to my task."

Farming Cameo :

47. Talgarth, Breconshire

The Talgarth district, situated to the east and south of the county, presents a very varied farming picture. It includes the highly productive and fertile valleys of the Usk and the Wye, and, in contrast, the hill and mountain ranges of the Black Mountains, parts of the Epynt range, and the Brecon Beacons, which rise to a height of nearly 3,000 feet. Rainfall over the most part averages about 35 inches a year, but it rises to more than 60 inches on some of the more westerly hills. Except for the small industrial region near Brynmawr, where carboniferous limestone is to be found, the soils are derived from the Old Red Sandstone, which gives rise to easily worked soils of good depth and fertility. They are normally rather acid and deficient in phosphates but, after fertilizing, are capable of yielding well.

As one would expect, farming systems also vary greatly within the district. On the upland farms, sheep of Welsh Mountain, Improved Radnor and Cheviot breeds are maintained for the greater part of the year on the common rough grazings of the hills ; only for lambing or during severe weather in winter are they kept in the enclosed farm land. Some Hereford and Hereford cross cows are also kept for the production and rearing of calves.

These hill farms are normally small, and the intensity of stocking is relatively high, so that although on the hill grazings there is ample grass during the summer and early winter, the months of February, March and

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April present a very real problem. The maximum quantity of hay is made under very adverse weather conditions, and spring oats are often cut green and fed on the straw without threshing. Crops such as rape and turnips, Italian ryegrass (sown under cereals) and rye are grown for consumption to supplement the grazing. They are rationed carefully by temporary fencing and, latterly, by the use of the electric fence for both sheep and cattle.

Formerly, the Hereford calves were marketed at 12 or 18 months old, but during the last few years the October calf sales, at which weaned calves 6-8 months old are disposed of at very satisfactory prices, have been established, thus obviating the necessity for overwintering and enabling a large number of breeding cows to be kept. As most of these calves are brought for "yarding" on Eastern Counties farms, the practice of dehorning shortly after birth is becoming increasingly general. A large proportion of lambs are now fattened off on rape or "seeds" and marketed before the end of the year; this again reduces the number of stock to be outwintered.

Because of the high elevation and exposed situation, these hill farms are ideally suited for the production of certified seed potatoes, and many do indeed specialize in the growing of this profitable cash crop. A high proportion of the crops generally obtains a certificate. These, marketed under the popular "Red Dragon" brand, are in great demand in the early potato-growing areas of South Wales.

On the lower slopes of the hills and in the valleys, management and farming systems are even more diverse. Hereford cattle are present in large numbers, but here the calves are normally marketed as stores at 12-18 months old. In a very few instances they are retailed and sold fat. Sheep are kept on most holdings, but the ewes tend to be larger and less hardy than those of the hill farms. The Clun forest is extremely popular for crossing purposes and in self-maintained and pure-bred flocks. The Suffolk ram is also in demand, mainly for crossing for early fat lamb production.

Cash crops of various types are more frequent on the lowlands, and in the drier eastern area cereals are grown for seed. The Hay and Talgarth Seed Growers' Association, which specializes in the production of cereal seed bred by the Aberystwyth Welsh Plant Breeding Station, have for a number of years sent first-class quality seed of S.147 and S.172 winter oats, and S.84, Maldwyn (S. 221), and Milford (S. 225) spring oats to all parts of the country.

There has been a considerable fall in milk production since 1949, but it is still produced on a number of farms. The predominating breed is the dual-purpose Shorthorn, but there are also appreciable numbers of Ayrshires and Friesians.

In recent years we have seen many changes in the Talgarth district; hundreds of acres on the borders of the hills have been reclaimed from bracken-covered rough grazing to productive grassland, many old pastures have been broken up, cropped and reseeded to form first-class leys. There has been a change, too, in the management of stock; more ewe lambs are wintered at home on the young grassland, instead of being sent away to lowland dairy farms, and many more wether lambs are sold fat rather than as stores. Lime and fertilizers, previously regarded with some suspicion, are now looked upon as necessities of productive farming. Finally, attestation has made remarkable progress, and we can confidently expect that bovine tuberculosis will shortly be a thing of the past in this area.

G. R. Adams
District Advisory Officer

FARMING AFFAIRS

The Mechanic on the Farm :

8. Grinding and Cleaning Engine Valves

The most important benefit from decarbonizing an internal combustion engine is the opportunity which it provides for improving the compression by attention to the valves. Valves and seatings that are badly burned must be refaced, and refacing is a job for the implement agent. But usually they are only pitted and can be put right by grinding.

When the valves have been removed, they should be cleaned to remove the carbon, and the stems should be polished with very fine emery cloth. Traces of emery must be washed off at once with petrol. The valve guides should then be cleaned. For this, the valve belonging to the guide should be used, the valve stem being dipped in petrol and worked vigorously up and down in the guide.

Throughout the treatment, each valve must be kept to its original seating. Therefore, when the valves are out of the engine they should be kept apart from one another. A wooden block with drilled and numbered holes to receive the stem valves is a great help in preventing the reassembly into the wrong seatings.

Valve grinding can be made easier if a light spring of a suitable size is threaded over the valve to engage against the guide and hold the valve off its seating whenever the pressure is released from the screwdriver brace or other grinding tool being used.

Coarse grinding paste should be spread on the contact surface of the valves, and the brace should be rotated backwards and forwards, the valve being lifted at frequent intervals and given a quarter turn to bring it to a fresh position. This should be carried on until an even and continuous seating is obtained on both the valve and the seat. The coarse grinding paste should then be wiped off and some fine paste substituted so that the final grinding shall give a finished surface. Valve seats should not be pared away any more than is necessary to restore the contact surface and produce a gas-tight seal. If the seating becomes too deeply recessed, the path of the gases is obstructed. The valves and valve seats should be wiped with a clean rag, and before assembly the valves, seats and guides should be washed with petrol to remove all traces of grinding paste.

Attention must also be paid to the condition of the valve springs, since these deteriorate with use. They can be examined by standing them on a flat surface to see whether they are all the same length. If possible, they should be compared for length with a new spring or with the maker's measurement for a new spring. Springs that have lost their resilience will be short, and they must be replaced.

H. J. Hine

Christmas and the Harvest Link In certain parts of the Continent there still exist a number of unusual customs that link up Christmas and harvest time. Most of these owe their origin to the "corn spirit" that was said to be inside the last sheaf to be cut. The corn spirit was a creature of many guises, bird and animal : in one form it was an old lady, known as the "corn mother," but more commonly it was a goat. Even today, old countrymen in parts of Germany solemnly aver that "the goats are chasing each other," when the corn bends before the wind. In Bavaria the last sheaf was known as "the goat," and in Mosbach in Baden it was usual for the sheaf to be made up in the form of a goat. In some areas of Switzerland the man who cut the last bit of corn was himself called "the goat," and was led from house to house with a bell round his neck like the

FARMING AFFAIRS

animal he represented. If a harvester became ill his workmates would remark: "He's been butted by the corn goat."

In most places where Christmas mummers still survive, one of their number is usually dressed in a goatskin to represent the corn spirit. In Sweden the goat appears at Christmas as the *Julbuck*—the "Yule Goat," while in one particular town—Bergslagarad—a man wrapped in straw and wearing the horns of a goat on his head impersonates the animal. In some parts of Europe, where the corn spirit was said to be a wolf, there were similar customs. In Poland, for example, a man dressed up in a wolfskin was led around the houses at Christmas and was rewarded by gifts of money.

The farmers of Willstad, Sweden, have an after-supper custom on Christmas Day, in which, by arranging what is called the "Angel Dance," they safeguard the flax crop. During the course of this straw made up into the shape of the "Yule Goat," or in some cases the "Yule Ram," is thrown among the dancers, who are invited to catch it. The making of the goat is, incidentally, quite a craft. It is usual for the effigy to be placed eventually beneath the Christmas tree for the children.

Another Scandinavian custom reminds us that the pig, too, was sometimes thought to have been the corn spirit. It is still customary at Christmas to bake bread or cakes in the shape of a boar, and, indeed, at one time the "Yule Boar," as it is called, was actually made from the flour obtained from the last sheaf. It was on the table throughout Christmas, and, in some instances, was kept until sowing time, when part of it was mixed with the seed and the rest shared between the men and the horses. This was said to ensure a good harvest.

A custom peculiar to the district of Brucke in Styria had a charm of its own. There the corn spirit took the shape of a woman—the "corn mother." It was the practice for the oldest married woman of the village to model the last sheaf into the shape of a woman. The best ears were, however, taken from the sheaf and woven into a garland of flowers, and this was placed on the head of the prettiest girl, who was then taken to the farmhouse for the harvest celebrations.

The routine varied a little throughout the district, and sometimes the corn mother was carried on a pole by the lads of the village, while the girl led the way to the farm, where the farmer received the garland. After the harvest supper and dance the effigy of the corn mother was left in the barn until the harvest had been threshed. The straw from the garland was kept until Christmas, when it was placed in the manger to keep the cattle from harm.

These old ceremonies and customs, which are still solemnly enacted in some of the remoter areas of Europe and Scandinavia, serve to emphasize how strongly linked are the festivals of harvest and Christmas.

Bernard Shough

Retirement of Sir James Scott Watson Sir James Scott Watson, Chief Scientific and Agricultural Adviser to the Ministry of Agriculture and Director-General of the National Agricultural Advisory Service since 1948, is retiring from the Public Service at his own request on December 31, shortly after reaching the age of 65. He will be succeeded as Chief Scientific and Agricultural Adviser by Professor H. G. Sanders, who is at present Professor of Agriculture at Reading University. The post of Director-General of the N.A.A.S. will be discontinued.

FARMING AFFAIRS

Christmas Trees Woodland owners are busy just now reaping a strictly seasonal, but profitable, harvest—the Christmas trees which will decorate our living rooms and shop windows over the festive season. These trees come from two sources—plantations (such as that shown in our cover picture) formed especially to grow trees for decoration, which may or may not carry roots, and the tops of trees grown primarily for timber and removed in the course of normal thinnings. Because of the need to protect our valuable coniferous plantations from insect pests and fungus diseases that might be brought in from abroad, the importation of Christmas trees is virtually prohibited, so the home grower has a clear field. The only exceptions to this rule are the Trafalgar Square tree from Norway, and a few others, which are brought in under special licence, inspected before landing, and kept within industrial seaport towns where they are unlikely to affect growing tree crops.

The only kinds of tree acceptable for the more exacting foliage markets, such as Covent Garden, are the Norway spruce (*Picea abies*) and the Douglas fir (*Pseudotsuga taxifolia*). But in some districts Scots pine and other evergreen conifers find a ready sale, though usually at lower prices. Sitka spruce is unsuitable because of its prickly foliage. Wholesale prices vary with the size of the tree from about 1s. per foot of height for small specimens, to 2s. per foot of height for big ones. The normal range of sizes is from 18 inches up to 12 feet, but some much bigger trees are used out of doors.

One of the principal suppliers is the Forestry Commission, which has sold, in a single season, over half a million Christmas trees worth, at wholesale rates, nearly £100,000. The production of Christmas trees is, however, incidental to the Commission's main work of timber production, and there is plenty of scope for the private grower—farmer or nurseryman—who has suitable land available to help supply the Christmas market. Provided they are moderately fertile, odd areas of former woodland or rough grazing land that cannot conveniently be used for forestry or agriculture may well be devoted to this crop. Spruce will thrive on most moist grassland, but the really wet patches will need to be drained. The trees should be turf-planted, and the area fenced against rabbits. Large transplants cost £7 10s. per thousand, and if they are planted 2 feet apart, nearly 11,000 can be carried on one acre. They are best harvested in stages, beginning about four years after planting, and thinning them out so that those trees left to grow bigger get more space. Trees 3 feet tall bring in about £150 per thousand, and the prices increase as the crop grows older and taller. Adequate spacing is essential at all times, as the lower branches must bear a lot of foliage. The only serious risk to the crop, apart from rabbits, is theft; and for this reason it is better not to form plantations beside public roads near big towns.

Farming Grass Five farms come under the camera in the Ministry of Agriculture's new film, *Grassland*, each of which shows effectively how great a contribution well-managed grass can make to the economy of most farms. The farms shown represent different types of farming, rather than any particular area or district. They are, in order of presentation, a hill farm 900–2,000 feet up; a small upland farm at 800 feet; a small all-grass dairy farm on heavy low-lying land; an alternative husbandry farm of 260 acres on light land with about 19 inches rainfall; and one concerned primarily with beef production.

One of the chief points which the film makes is that grass is not only a summer food: good management and good conservation can store on the farm the summer surplus as invaluable winter food. Grass also rests the

FARMING AFFAIRS

land and at the same time builds up fertility which a later corn crop can cash most profitably.

The old tag that seeing is believing is particularly apposite to farming skills, and this film certainly promotes the evidence of what really good grass farming can achieve.

The film will be available on hire from the Central Film Library, Government Building, Bromyard Avenue, London, W.3.

16 mm. Kodachrome

Running time : 40 minutes.

Oxford Farming Conference The theme of next year's Oxford Farming Conference, which is being held on January 4-5, 1955, will be "Farming for Today's Market". The usual attractive programme has been arranged for this—the ninth conference in the series—and, to judge from the names of the many prominent agriculturists who have promised to speak on the problems of agricultural production and marketing, it should have a very wide appeal.

Full details of the conference may be obtained from the Honorary Secretary, Mr. M. H. R. Soper, University Department of Agriculture, Oxford.

BOOK REVIEWS

Indigenous Peoples: Living and Working Conditions of Aboriginal Populations in Independent Countries. International Labour Office. 24s.

For the purpose of this study, indigenous persons are described as "descendants of the aboriginal population living in a given country at the time of settlement or conquest (or of successive waves of conquests) by some of the ancestors of the non-indigenous groups in whose hands political and economic power at present lies". The work attempts to deal with all such groups in the five continents, instead of treating them on a regional basis, as was done in a previous I.L.O. report. It would have been better, perhaps, if the earlier precedent had been followed, as it is obviously impossible to compare conditions of indigenous groups in Latin American countries, where they are estimated to constitute up to 80 per cent of the total population, with their counterparts in India (8 per cent), New Zealand (6 per cent), Australia (0.3 per cent) and the United States of America (0.2 per cent).

The book also claims that these groups require special treatment, particularly as regards opportunities and conditions of employment, because they adhere to their own languages, mythical beliefs and practices, have semi-feudal systems of land tenure, and are geographically remote. When their living conditions with regard to food, housing, health and education are described in detail, however, it becomes apparent that they differ in no essential from any other primitive peasant community living in feudal or even pre-feudal stages of evolution. Briefly, they suffer from undernourishment and heavy reliance on starchy foods, housing which falls far short of even modest requirements of health and decency, prevalence of diseases, mainly as a result of poor diet and lack of hygiene, and illiteracy. Unfortunately, no mention is made of transport facilities or of recreation and entertainment.

As agriculture and stock-raising are the central activities of indigenous folk, the report acknowledges that there is a close relationship between agriculture and their economic and social conditions. Their agriculture again is essentially that of any primitive peasant community—an uneven distribution of land-ownership, production considerably restricted by over-population, and soil exhausted through over-use, overgrazing and primitive techniques. Thus wherever an indigenous group constitutes a high percentage of a population, the problems it raises are an essential part of the whole agrarian question.

The last part of the report is mainly devoted to recent agrarian reforms as typified, for example, by the aims of the newly-created (1952) Ministry of Rural Affairs in Bolivia: (a) to co-ordinate the rural with the national economy; (b) to absorb the indigenous groups into the national culture; (c) to encourage the co-operative movement in rural communities; (d) to develop credit for farming co-operatives and communities; (e) to improve health and hygiene in rural areas; and (f) to promote settlement. Accordingly, the basic criterion which has guided the activities of the International Labour Office itself

BOOK REVIEWS

in this field is that backward and oppressed sections of a population should be dealt with as a matter of general reform, rather than as action on behalf of any particular race.

The book is a veritable mine of information on the welfare and development of rural people. Its usefulness is slightly marred by the absence of an index and by a most unsatisfactory way of referencing (to find the full title of a book cited on page 229 one has to worm one's way back through three other pages to page 25!). Some of the illustrations are magnificent and the price is more than reasonable for a work of this type and magnitude.

G.P.H.

The Land First. RALPH WHITLOCK. Museum Press. 25s.

Wiltshire seems destined to figure in the agricultural annals of this century as prominently as Norfolk did in those of the eighteenth, for it is rich in literary talent. This offering is from the pen of one of the best known of the county's agricultural writers, Ralph Whitlock, who presents to us a conspectus of British farming and most of its problems. After a thumb-nail sketch of the way by which we have come, he describes the distribution of farming systems and then examines the enterprises *seriatim*. Chapters on general subjects—machinery, buildings, communications, water and drainage and so forth—follow; and he winds up with words of wordly wisdom on markets, money and men.

The tale is unfolded in an engaging manner, a complex subject being treated sectionally and simply. Although for the most part it is told impersonally, Mr. Whitlock follows the precedent of other farmer-authors in switching from time to time to autobiography, citation of father's practices, and neighbours' *obiter dicta*; and he regales us with incidental tales, such as that of the pig whose company for six months apparently meant a good deal more to its cottager-owner than the meagre profit on its scale.

The author's search for simple explanations leads him occasionally along paths where scientists would hesitate to follow, and there are a few misprints and some repetition. But these are small blemishes in a very readable book, illustrated by beautiful photographs, which should be popular alike with the agricultural student, the foreign visitor, who now comes to us in such flattering numbers, and that large body of urban dwellers who are nowadays interested in rural affairs.

W.B.M.

Ways of the Ant. JOHN CROMPTON. Collins. 15s.

Mr. Crompton who is the author of two interesting and instructive popular books, *The Hunting Wasp* and *The Spider*, has now turned his attention to the ants. His new book attempts, as he says in the preface, to "present ants not as biological specimens but as interesting beings leading their lives just as we lead ours—but in a different way and under different impulses." The result is a book, eminently readable, for Mr. Crompton writes with great facility and charm, but frankly disappointing, for in it we learn little of how ants really do live their daily lives.

When Solomon bid the sluggard "go to the ant . . . consider her ways and be wise," he was not merely concerned with the fact that a common ant of the fields of Israel (*Messor barbarus*) harvests grain. He wondered at their so doing, yet "having no guide, overseer or ruler." Mr. Crompton, on the other hand, gives us only the outward picture of a few species. He finds it wonderful that some species of ants harvest grain, grow mushrooms, and make slaves, but misses the far greater wonder of the social mechanisms which lie behind the day-to-day organization of even the most commonplace ant colony. He says in his preface that we do not know what the impulses are which govern the daily lives of the ants, yet in fact much is now known about the factors at work. Modern research has shown that some ants are "lazy" and others "hard-working", and that the way in which these different individuals behave influences the behaviour of their neighbours. Mr. Crompton has his criticism of such experiments: to quote, "half the tricks that observers play on insects under the name of 'experiments' are not fair. They get their subjects thoroughly upset and then judge their 'intelligence' by what they do immediately in situations never experienced before." This may be true of the older naturalists of the last century, but it certainly is not true of the majority of modern experimental biologists, who incidentally work both in the field and the laboratory.

Describing any warfare, he fails to mention how the ants distinguish friend from foe by means of their difference in odour, and when he does describe the behaviour of individuals, his ants are humanized to the extent of being "bored" or filled with "fortitude". As a result of this attitude, Mr. Crompton misses much of the real interest and point of ant study. Nevertheless, the book should attract many readers and give them some knowledge of the ants.

D.W.M.

BOOK REVIEWS

The Open Fields (Second Edition). C. S. and C. S. ORWIN. Oxford University Press. 30s.

Dr. Orwin is one of the greatest of our agricultural historians, and *The Open Fields*, which he and Mrs. Orwin first wrote in 1938, is one of the greatest of all his books. Indeed, it has long been recognized as a classic, and nobody interested in our rural past will be unfamiliar with its contents or arguments. The second edition of such a book is, then, a major event in agricultural literature.

The Open Fields is really two books in one cover—the first, a history of the origins of the Open Fields in this country; the second, a massive case-study of Laxton in Nottinghamshire, the one parish in all England where the Open Field System survives to this day. Both sections have been carefully revised in this new edition. The general historical section, for instance, contains modern conclusions on the formation of Braunton Great Field and further discussion of those alleged “unploughed balks” between the strips, which are once more firmly relegated to mythology. Recent research, too, has modified many of the older views on the distribution and extent of the system, and the map in the 1938 edition has now been withdrawn as obsolete. There is also a summary of new evidence on the peculiar question of lynchets, which tantalizingly leaves the reader more informed but even more puzzled than before. It is a humbling thought that the purpose of terraces once known to every ploughboy still eludes the scholars of the twentieth century.

Laxton itself has now passed from its old owner, the Earl of Manvers, to the Ministry of Agriculture, and is today managed by the Agricultural Land Commission, whose local representative has enviably become a member of the jury of the Manor Court. Thus has this unique and most ancient of our “living agricultural documents” entered the keeping of the State, the most permanent of public institutions. We have lost much of our rural past, but it is unlikely that we shall lose the last of the Open Fields.

This new edition has only one slight weakness—a bibliography which would be greatly improved by the addition of some of the items listed by Chaloner in the *British Agricultural Review* for 1954—and it will unquestionably deserve and receive a welcome at least equivalent to that which greeted its first publication. In 1938 the book won the praise of the scholars; and the manner in which it was prepared won the praise, perhaps even more significant, of an equally exacting audience—the Open Field farmers themselves. Some years ago I spent a “dirty-boot” holiday at Laxton, and I well remember the remark of one of the farmers who knew Dr. Orwin when he was collecting the material. “Professor Orwin!” he said, “Ah, there was a careful man for you! Whenever he was not certain of something he would come all the way here from Oxford and couldn’t go home till he had settled it.”

The Open Fields owes its weight to a superb alliance of historical scholarship, agricultural knowledge and personal insight. It owes its charm to the peculiar lucidity of its style. But it owes its enduring quality to the fact that it was written by a man who would, without fail, investigate any uncertain point on the spot, and would not go home till he was satisfied.

N.H.

Department of Hop Research, Wye College, Annual Report for 1953. 4s.

The work on the breeding of improved varieties of hops at Wye has had a dual aim: first, to produce replacements for imported hops (Bullion and Brewer’s Gold are among the now generally accepted substitutes); secondly, to breed hops which are resistant to disease and which lend themselves to machine picking. Many of the new varieties at Wye pick well by machine and do not shatter as much as the older kinds.

Hop growers who have difficulty in maintaining a satisfactory organic matter content in their soils will be interested in an account of trials in which hops grown under a closely grazed timothy-clover sward appeared to be at least as good as when grown under arable cultivation. An investigation on spacing also merits attention. Trials of the effect on the growth of hops of varying wirework (13–17½ feet) and spacing (6–9 feet) have indicated that high wirework and wider spacing both encourage the development of hops suitable for machine picking. Wider spacing also facilitates cultural operations and ensures that the crop receives adequate air and light.

Research at Wye on drying has led to the conclusion that with a machine-picked crop it is generally safer to overdry slightly than to risk having a large proportion of underdried whole hops, since overdried hops reabsorb moisture more readily than underdried hops lose moisture. It appears, too, from these experiments that damage caused by machine picking would be of little consequence if a technique of drying which would reduce further handling of the hops could be evolved. A report of a survey in the West Midlands emphasizes the desirability of using a succession of varieties to avoid having to pick any hops in an over-ripe condition.

Copies of this Report may be obtained from the Secretary, Wye College, Wye, Ashford, Kent.

A.J.L.L.

BOOK REVIEWS

The Archers of Ambridge. GEOFFREY WEBB and EDWARD J. MASON. Newnes. 8s. 6d.

The Archers—fact or fiction? So familiar has this village community of Ambridge become to the ten millions or so people who listen to this daily B.B.C. programme that they seem to have assumed the substance of flesh and blood, their pleasures to become our pleasures, and their problems to become almost a personal anxiety. This, in fact, is the highest commendation that could be paid to the skill of the script-writers, Geoffrey Webb and Edward Mason. The dialogue, the deftly interlocking jigsaw pieces of rural life in all its light and shade, the essential human qualities, all flow so freely and so naturally as to disguise their fictitious nature.

Now this indefatigable pair have added to the Ambridge saga by a very readable book. The story ante-dates the radio serial and is concerned with the reactions of the Ambridge folk to Mr. Fairbrother's intention to exploit the ironstone deposits under his land. It moves clearly and swiftly and has its moments of excitement, as when some of the less responsible people in the village strike back against Mr. Fairbrother. Grace Fairbrother, Jane Maxwell, a young attractive girl working on the farm, and Phil Archer, provide a balancing lighter side in the complexities inherent in a state of young love in conflict. Just the kind of book for Christmas relaxation.

S.R.O'H.

Residual Values of Fertilizers and Feeding Stuffs. (Sixth Report of the Scottish Standing Committee). H.M. Stationery Office. 6d.

The standing Committee, which was appointed in January, 1949, to calculate the values to be attached to Scotland to unexhausted manures and feedingstuffs and to prepare annually tables of such values, has just published its 1954 report.

The Committee has not found it necessary to amend any of its initial recommendations, which are reproduced, together with the revised unit values, in the report. The new values take into account the effect of phosphatic and nitrogenous fertilizer subsidy payments.

L.W.T.

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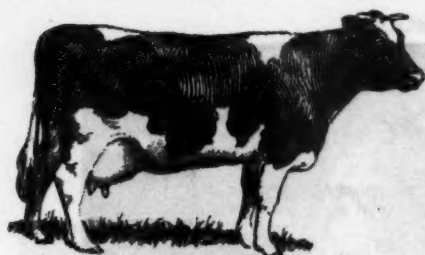
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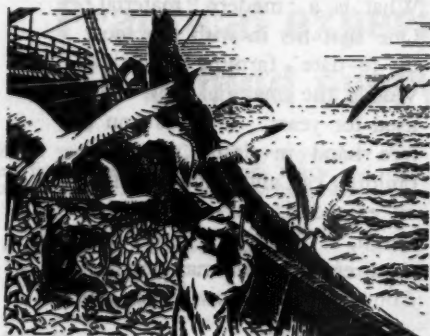
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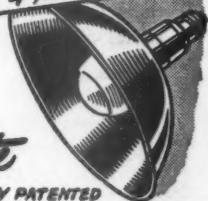
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